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January 11, 2021

Mr. Ricky Vargas
Land and Redevelopment Program Branch
Land, Chemicals and Redevelopment Division
USEPA Region 2
290 Broadway, 25th Floor
New York, New York 10007

Re: Justification for CA550 Final Notice Determination
Former Chevron Perth Amboy Facility
Perth Amboy, New Jersey
SRP PI #003621

Dear Mr. Vargas:

On behalf of Chevron Environmental Management Company (Chevron), Parsons is submitting this CA550 Final Notice Determination to the United States Environmental Protection Agency (USEPA) and the New Jersey Department of Environmental Protection (NJDEP) for review and approval. This letter serves to document that site-wide remedial construction complete has been completed in accordance with the HSWA Permit Renewal at the Former Chevron Perth Amboy Facility (Facility) in Perth Amboy, NJ.

INTRODUCTION

Corrective measures implementation (CMI) work at the Facility commenced in 2012. As of September 2020, all requirements for remedial construction completion for soil in 49 areas of concern (AOCs) and 45 solid waste management units (SWMUs) (Attachment 1) have been met. The remaining AOC and eight SWMUs were either approved for No Further Action (NFA) or were associated with the West Yard/Amboy Field or North Field.Remedial construction methodologies implemented included in situ chemical oxidation (ISCO) injections, ISCO soil mixing, soil excavation and Corrective Action Management Unit (CAMU) internment, in situ stabilization (ISS)/ex situ stabilization (ESS) soil mixing, in situ chemical fixation (ISCF), permeable reactive barrier (PRB) wall installations, arsenic cap installations, enhanced in situ bioremediation (EISB) injections, electrical resistance heating (ERH) system installation, biosparge system installations, air sparge/soil vapor extraction (SVE) system installation, SWMU 43 cap installation, final CAMU closure, monitored natural attenuation (MNA) monitoring system for groundwater, and filing of deed notices.

This document provides a comprehensive list of all submittals and summarizes corrective measures (CMs) implemented at the Facility to justify the CA550 determination. The Chevron

submittals are listed, as appropriate, at the end of each AOC/SWMU discussion. References for agency documents cited are provided at the end of this letter.

Historical and Regulatory Background

The Former Chevron Perth Amboy Facility is an approximately 260-acre industrial facility that has been used for industrial operations since 1920. Barber Asphalt Company built and operated an asphalt refinery in 1920. The California Oil Company (later Chevron) purchased the property in 1946 and expanded operations into a full-service refinery in 1950. In 1983, Chevron shut down several process units and scaled back refinery operations to asphalt topping. Asphalt operations were suspended in 2009. In August 2012, Chevron sold a large portion of the property to Buckeye Partners, L.P.

The Facility is bounded to the north and south by industrial properties and to the west by commercial and residential properties. The site is bounded to the east by the Arthur Kill. Woodbridge Creek flows from the northwest to the southeast through the northern portion of the Facility. Spa Spring Creek flows along the northern property boundary and discharges into Woodbridge Creek. The current facility consists of tank fields, process areas, offices, mechanical shops, wastewater treatment units, pipelines, and tanker docks.

Previous Environmental Investigations

Chevron received a Resource Conservation and Recovery Act (RCRA) Hazardous and Solid Waste Amendments (HSWA) Permit for the Facility on June 1, 1994. After the permit was issued, Chevron performed a RCRA Facility Investigation (RFI) (Chevron 2003), Supplemental RFI (Chevron 2008), and Corrective Measures Study (CMS) (Chevron 2008) to evaluate the environmental impacts and determine appropriate CMs throughout the Facility. Chevron received a RCRA HSWA Permit Renewal for the Facility from the USEPA, with an effective date of September 3, 2013 (USEPA 2013).

Chevron's submittals related to the RFI and CMS include:

- Chevron. 2003. Full RCRA Facility Investigation (RFI) Report. November.
- Chevron. 2008. Supplemental RCRA RFI Report. February.
- Chevron. 2008. Corrective Measures Study Report for the Main Yard, East Yard and Central Yard. November.

ON-SITE CORRECTIVE MEASURES

Module III included in the HSWA Permit Renewal (USEPA 2013) describes the approved CMs for each AOC and SWMU. The approved CMs, Remedial Construction Completion status, and regulatory submittals for each AOC and SMWU (Attachment 1) is described in the following subsections.

AOC 1

AOC 1 consists of a potential discharge from Tank 1, which is in the Main Yard immediately north of Maurer Road. Tank 1 was dismantled in 2002. During the demolition of Tank 1, petroleum stained soils were identified under the northern half of the tank. Approximately 330 cubic yards of impacted soil were removed. Post-excavation samples were collected following remedial action activities. Sample analysis detected arsenic in one of the post-excavation samples at a concentration of 22.1 milligrams/kilogram (mg/kg), above the non-residential direct contact soil cleanup criteria (NRDCSCC) and CMI action level of 20 mg/kg. Analysis of additional groundwater samples collected at MW-133 showed benzene concentrations were non-detect.

Exceedances of the applicable soil cleanup criteria are included in the deed notice for the Main Yard.

AOC 2

AOC 2 consists of a potential discharge from Tank 3, which is in the Main Yard immediately north of Maurer Road. During demolition of Tank 3, stained soils were noted beneath the northern portion of the tank floor. Approximately 600 cubic yards of stained soils and rail ties were excavated from this area. Petroleum-impacted soils were remediated using excavation and off-site disposal. No exceedances of the applicable regulatory criteria/standards were identified in analyses of post-excavation soil and groundwater samples. The HSWA Permit Renewal proposed NFA for both soil and groundwater.

AOC 3

AOC 3 consists of a potential discharge from Tank 4. Sporadic exceedances of benzo(a)pyrene (BaP) were observed in soil. Exceedances of the applicable soil cleanup criteria are included in the deed notice for the Main Yard.

AOC 5

AOC 5 was identified when a petroleum substance was observed during excavation of Underground Storage Tank (UST) E3. The CMs approved in the HSWA Permit Renewal are:

- ISS for lead in soil and subsequent filing of a deed notice
- Filing of a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISS/ESS pre-design investigation (PDI) was conducted in 2016 to identify data gaps and evaluate the lead and BaP impacts in soil. Given the proximity of SWMU 39 to AOC 5, the two units were addressed as one area and referred to as AOC 5/SWMU 39. The results of the PDI and the proposed CM were presented in an ISS/ESS implementation work plan (IWP) for the combined AOC 5/SWMU 39 area (Chevron 2016). NJDEP provided comments on the AOC 5/SWMU 39 ISS/ESS IWP on November 17, 2016 (NJDEP 2016). Chevron provided a Revised IWP and letter responses to the NJDEP comments on February 24, 2017 (Chevron 2017). NJDEP approved the responses to comments (RTCs) in a letter dated March 24, 2017 (NJDEP 2017). ISS and ESS were implemented in AOC 5/SWMU 39 from September 11 through November 11, 2016, as proposed in the approved AOC 5/SWMU 39 ISS/ESS IWP. Approximately 2,645 cubic yards of soil were removed

from the AOC 5/SWMU 39 ESS areas, and approximately 1,380 cubic yards of soil from the AOC 5/SWMU 39 ISS areas were stabilized in situ and remain in place. The excavated soil intended for disposal was transported directly to the Facility's on-site CAMU. The AOC 5/SWMU 39 ISS/ESS Construction Completion Report (CCR) was submitted to USEPA and NJDEP on November 12, 2019 (Chevron 2019), and approval was received in a letter dated March 6, 2020 (USEPA 2020).

An ISCO PDI was conducted at AOC 5/SWMU 39 between 2014 and 2016. The PDI findings were summarized in an October 2016 letter to USEPA and NJDEP requesting NFA for benzene in soil at SWMU 39 and a transition to MNA for groundwater at SWMU 39 and AOC 5 (Chevron 2016). In a letter dated December 22, 2016, NJDEP approved the NFA for benzene in soil and provided comments for groundwater (NJDEP 2016). Chevron provided responses to the NJDEP comments in a letter dated December 19, 2019 (Chevron 2019).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to AOC 5 include:

- Chevron. 2016. In Situ and Ex Situ Stabilization Implementation Work Plan. AOC 5/SWMU 39. September.
- Chevron. 2016. Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at Solid Waste Management Unit 39 and Area of Concern 5. October.
- Chevron. 2017. Response to NJDEP Comments Response Action Item #1. ISS/ESS Implementation Work Plan – AOC 5/SWMU 39. February.
- Chevron. 2019. ISS and ESS CCR for AOC 5 and SWMU 39. November.
- Chevron. 2019. Response to NJDEP Comments on Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at Solid Waste Management Unit 39 and Area of Concern 5. December.

AOC 6A

AOC 6A contains oily petroleum material observed during historical investigations. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

An NFA was proposed for arsenic in soil in the Arsenic Cap Final Design Report (FDR) and was approved by NJDEP in a letter dated June 4, 2014.

All deed notices are discussed in the *Deed Notices* section.

AOC 6B

AOC 6B contains oily petroleum material observed during historical investigations. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

An IWP to address arsenic-impacted soils was submitted to USEPA and NJDEP on November 12, 2019 (Chevron 2019), and approval was received on December 11, 2019 (USEPA 2019). The proposed cap consisted of areas containing existing infrastructure and buildings and areas where a cap will be constructed. The cap was constructed using a visible demarcation consisting of non-woven geotextile fabric overlain by a minimum 1-foot-thick physical barrier of certified clean dense-grade aggregate (DGA) to address arsenic-impacted surface soil. The arsenic cap CM was completed in March 2020.

Light nonaqueous phase liquid (LNAPL) impacts associated with this area are discussed in the *LNAPL* section.

Submittals related to AOC 6B include:

- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 6B. November.

AOC 6C

AOC 6C contains oily petroleum material observed during historical investigations. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

AOC 6C is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

AOC 7

AOC 7 consists of tar-like material detected at a groundwater monitoring well. Soil and groundwater modeling of potential constituents of concern (PCOCs) did not demonstrate any exceedances. No remedial construction was required as a corrective measure for AOC 7 in the HSWA Permit Renewal.

AOC 8

AOC 8 consists of oily and tar-like material detected at two historical soil borings. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- ISCO treatment for benzene concentrations >I00 micrograms per liter (µg/L) in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a Classification Exception Area (CEA) for groundwater

An ISCO PDI was implemented in 2015 to identify data gaps and evaluate benzene in soil and groundwater. An AOC 8 air sparge pilot study work plan was submitted to USEPA and NJDEP on June 4, 2019 (Chevron 2019). NJDEP provided comments on the work plan and Chevron submitted responses in an email dated June 18, 2019. USEPA and NJDEP approved the AOC 8 pilot study work plan on June 26, 2019 (USEPA 2019). The AOC 8 pilot study started on July 16, 2019, and

was completed on August 16, 2019. A summary of the pilot study and notification of intent to implement biosparging was submitted to USEPA and NJDEP on October 21, 2019 (Chevron 2019). The AOC 8 IWP was submitted to USEPA and NJDEP on April 30, 2020 (Chevron 2020), and system installation began in second quarter 2020. An air permit application for AOC 8 was submitted to NJDEP on June 15, 2020 (Chevron 2020), and permit approval was received on September 24, 2020 (NJDEP 2020). The air sparge/SVE system installation began in May 2020. The IWP was approved by USEPA and NJDEP on May 22, 2020 (USEPA 2020) and operation of the system is expected to being in January 2021.

LNAPL impacts associated with this area are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 8 include:

- Chevron. 2019. Area of Concern 8 Air Sparging Pilot Study Work plan. June.
- Chevron. 2019. Intent Letter. AOC 8 Summary of Air Sparge Pilot Study and Notification of Intent to Implement Biosparge. October.
- Chevron. 2020. Area of Concern 8 Air Sparging and Soil Vapor Extraction Implementation Work Plan. April.
- Chevron. 2020. Pre-Construction Permit for Construction and Operation of Air Sparge/Soil Vapor Extraction System for Remediation of Soil and Groundwater. June.

AOC 9A

AOC 9A consists of contamination detected at groundwater monitoring well NF-10. The CMs approved in the HSWA Permit Renewal are:

- NFA for soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

Between 2014 and 2016, a combined ISCO PDI was completed for the shallow groundwater benzene impacts at AOC 9A and SWMU 20. The AOC 9A IWP proposed excavation and disposal of impacted soil in the CAMU to address benzene-impacted groundwater (Chevron 2017). The soil excavation and disposal CM was implemented between November 28 and December 18, 2017. Approximately 1,288 cubic yards of soil were excavated from three areas in AOC 9A for disposal in the Facility's CAMU. Approval of the IWP was received from NJDEP on September 4, 2018 (NJDEP 2018). Based on the post-implementation results, a combined CCR/IWP and associated Discharge to Groundwater/Permit-by-Rule (DGW/PBR) request to address the remaining benzene impacts was submitted to NJDEP and USEPA on October 14, 2019 (Chevron 2019). USEPA and NJDEP provided comments on the CCR/IWP in a letter dated November 20, 2019 (USEPA 2019). RTCs related to the ISCO implementation were submitted on November 21, 2019, via email, and the DGW authorization was received on November 25, 2019 (NJDEP 2019). A response letter addressing all comments was submitted to USEPA and NJDEP on January 27, 2020 (Chevron

2020). Sodium hydroxide and sodium persulfate were injected in Areas 1 and 2 between November 26, 2019, and July 2, 2020. Soil mixing occurred in Area 3 between April 6 and April 7, 2020. A total of 19,500 pounds of calcium hydroxide, 35,264 pounds of sodium persulfate, and 15,428 pounds of potassium persulfate was mixed into soil in Area 3. A combined volume of 18,027 gallons of ISCO reagents were injected at AOC 9A. The reagents included approximately 8,119 gallons of 25% sodium hydroxide and 21,029 gallons of 18.5% sodium persulfate (approximately 36,960 pounds). Chevron requested (2020) and received approval for a temporary 45 calendar day extension (i.e., PBR expiration on July 8, 2020).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 9A include:

- Chevron. 2017. Implementation Work Plan for Area of Concern 9A. November.
- Chevron. 2019. Construction Completion Report/Implementation Work Plan for Area of Concern 9A. October.
- Chevron. 2020. Temporary Extension of Permit-by-Rule Authorization for In Situ Chemical Oxidation Implementation at Area of Concern 9A. April.
- Chevron. 2020. Response to USEPA Comments on the Area of Concern (AOC) 9A Construction Completion Report (CCR)/Implementation Work Plan (IWP), dated October 2019. January.

AOC 9B

AOC 9B consists of contamination detected at groundwater monitoring well NF-11. The CMs approved in the HSWA Permit Renewal are:

- NFA for soil
- MNA and filing a CEA for groundwater

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

AOC 10

AOC 10 consists of stained soil and gravel observed during the visual site inspection in the vicinity of Tank 723. In 1989, the concrete pad below Tank 723 was extended, and soil and gravel, including all visibly stained soil and gravel, were removed to depths ranging from 10 to 20 inches. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA is proposed for groundwater

All deed notices are discussed in the *Deed Notices* section.

AOC 13

AOC 13 consists of the B-11 Oily Fill Area (Groundwater Quality Assessment Plan [GWQAP] Area I). This area was established based on oily fill material identified in a soil boring in the East Yard. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Further evaluation of groundwater

NFA was proposed for arsenic in surface soil in the Arsenic Cap FDR and was approved by NJDEP in a letter dated June 4, 2014.

AOC 14

AOC 14 consists of the GWQAP - Oily Fill Area III. Oily fill was observed in historical soil borings in the East Yard. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- ISS for lead in soil and filing a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

A combined ISCO PDI for AOC 14 and AOC 26 was initiated in 2015 in conjunction with the EY4b LNAPL PDI. An IWP for AOC 14 and AOC 26 proposed excavation with disposal in the CAMU and compliance averaging to address benzene impacted soil (Chevron 2017). The excavation CM was completed between November 3 and December 13, 2017. Approximately 1,208 cubic-yards of benzene-impacted soils were excavated from each treatment area, tested (if applicable), transported and disposed of in the on-site CAMU. The excavated areas were then backfilled using certified clean fill. NJDEP and USEPA provided comments on the IWP on November 14, 2019. RTCs were submitted to USEPA and NJDEP on February 13, 2020 (Chevron 2020), and approval was received on March 27, 2020 (USEPA 2020). A CCR was submitted to USEPA and NJDEP on May 5, 2020 (Chevron 2020). Engineering controls associated with AOC 14 are discussed in the *Engineering Controls* section.

An ISS/ESS PDI to evaluate lead and BaP impacts was conducted in 2016. Based on the results of the PDI, a letter request for an NFA determination for lead and BaP in AOC 14 soil was submitted to the USEPA and NJDEP 2017 (Chevron 2017). NJDEP approved the NFA request on July 5, 2017(NJDEP 2017).

An IWP to address arsenic-impacted surface soil in AOCs 14 and 26 and SWMU 26 was submitted to USEPA and NJDEP on October 17, 2019 (Chevron 2019) and approval was received on

November 13, 2019 (USEPA 2019). The proposed cap consisted of areas containing existing infrastructure and buildings and areas where a cap will be constructed. The proposed cap was constructed using a visible demarcation consisting of non-woven geotextile fabric overlain by a minimum 1-foot-thick physical barrier of certified clean DGA to address arsenic-impacted surface soil. The CM was completed in March 2020.

An ISCF PDI was conducted in 2019 to evaluate the nature and extent of arsenic impacts in groundwater. The ISCF IWP for AOC 14 and SWMU 26 was submitted to USEPA and NJDEP on January 29, 2020 (Chevron 2020) and USEPA and NJDEP provided comments via email on March 23, 2020. Responses to the USEPA and NJDEP comments were submitted on April 10, 2020 (Chevron 2020). Approval for the IWP and response to comments and the discharge to groundwater authorization were received on April 16, 2020 (USEPA and NJDEP 2020). The IWP proposed a permeable reactive barrier (PRB) wall to remediate arsenic impacts in groundwater and to prevent the potential migration of arsenic-impacted groundwater beyond the limits of AOC 14 and SWMU 26. The construction of the AOC 14/SWMU 26 PRB wall began on April 20, 2020, and was completed on May 1, 2020. With the field adjustment to the PRB wall alignment and a 12-foot gap, the total length of PRB wall installed in AOC 14/SWMU 26 was 255 feet. A mixture of zero-valent iron (ZVI) and certified clean sand was used as the reactive media for the construction of the PRB wall. A total of 137 tons (274,000 pounds) of ZVI was used to construct the PRB wall in AOC 14/SWMU 26.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 14 include:

- Chevron. 2017. Justification for No Further Action for Lead and BaP in Soil, Area of Concern 14. May.
- Chevron. 2017. Implementation Work Plan, Area of Concern 14 and Area of Concern 26. October.
- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil. AOC 14/26 and SWMU 26. October.
- Chevron. 2020. ISCF IWP AOC 14/SWMU 26. January.
- Chevron. 2020. Response to USEPA AND NJDEP Comments, ISCF IWP for AOC 14/SWMU 26. April.
- Chevron. 2020. Construction Completion Report for Area of Concern 14/26. May.

AOC 15

AOC 15 consists of a historical oil release of an unknown quantity at the Buckeye Perth Amboy Terminal LLC (Buckeye) Pipeline Manifold. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required

- MNA and filing a CEA for groundwater

An ISCO PDI was conducted between 2016 and 2018 to identify data gaps and evaluate benzene impacts in soil and groundwater. An IWP for the ISCO and excavation CMs at AOC 15 and SWMUs 6, 16, and 40 was submitted to USEPA and NJDEP in February 2020 (Chevron 2020). USEPA and NJDEP provided comments in a letter dated May 21, 2020 (USEPA 2020), and Chevron submitted RTCs on June 5, 2020 (Chevron 2020). Additional comments were provided by NJDEP in an email on July 30, 2020. Chevron provided an IWP Addendum and a response to the additional comments on August 5, 2020 (Chevron 2020). The DGW authorization was received from NJDEP on August 12, 2020 (NJDEP 2020). The excavation CM (SWMUs 6, 16, and 40 only) was completed between March 2 and April 17, 2020, and the soil mixing event occurred between August 14 and September 1, 2020. Approximately 2,000 cubic yards of benzene-impacted soil were excavated and disposed of in the CAMU. ISCO soil mixing covered an approximately 20,000-square-foot area. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 175,500 pounds of calcium hydroxide, 309,662 pounds of sodium persulfate, and 136,648 pounds of potassium persulfate.

LNAPL impacts associated with this area are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 15 include:

- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. February.
- Chevron 2020. Response to USEPA Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. June.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan Addendum for Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. August.

AOC 16A

AOC 16A in the Main Yard consists of the Oily Water Sewer System (OWSS). The OWSS was used to convey process waste and waste waters generated from process areas to the Effluent Treatment Plant (ETP). The OWSS extends throughout the previously active areas of the Facility and was integral to its operations. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Excavation, ESS and disposal in the on-site CAMU for BaP concentrations >10 mg/kg
- ISS for lead in soil and filing a deed notice afterwards
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required

- MNA and filing a CEA for groundwater

Benzene-impacted soil and groundwater associated with AOC 16A was addressed as part of the CM implementation at AOC 8, AOC 44, SWMU 16, and SWMU 35.

The AOC 16A NFA justification for lead and BaP in soil was submitted to the USEPA and NJDEP on January 21, 2020 (Chevron 2020). The NFA was approved by USEPA and NJDEP on September 9, 2020 (USEPA 2020).

Arsenic impacts associated with AOC 16A are discussed in the *Main Yard Arsenic-Impacted Surficial Soi*l section.

LNAPL impacts associated with this area are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 16A include:

- Chevron. 2020. NFA Justification for Lead and BaP in Soil: Main Yard. January.

AOC 16B

AOC 16B in the East Yard consists of the OWSS. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Excavation, ESS and disposal in CAMU for BaP concentrations >10 mg/kg and Toxicity Characteristic Leaching Procedure (TCLP) lead levels >5 milligrams per liter (mg/L) in soil
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and lead concentrations >50 µg/L in water and filing a deed notice afterwards
- ISCO treatment for benzene concentrations >I00 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

A PDI was conducted in 2017 to address lead contaminated soil in AOC 16B Area 1 (East of Tank Basin 766). The results of the AOC 16B Area 1 PDI and the proposed CM for AOC 16B Area 1 were presented in the AOC 16B Area 1 IWP that was submitted to NJDEP and USEPA on August 29, 2017 (Chevron 2017). The implementation of the ESS CM in AOC 16B Area 1 occurred between September 26 and October 6, 2017. Approximately 345 cubic yards of soil were stabilized and removed from the AOC 16B Area 1 ESS areas. The stabilized soil was excavated and transported directly to the Facility's on-site CAMU for disposal. USEPA and NJDEP provided comments on the

AOC 16B Area 1 IWP in a letter dated February 21, 2018 (NJDEP 2018). Responses to the USEPA and NJDEP comments were submitted on November 15, 2018 (Chevron 2018). The ESS IWP was approved on March 27, 2020 (USEPA 2020). The AOC 16B Area 1 CCR was submitted to USEPA and NJDEP on June 19, 2020 (Chevron 2020) was approved on September 2, 2020 (USEPA 2020).

AOC 16B Area 2 is in the southeastern side of Tank Basin 759 and along East Yard Street. A justification for no further investigation (NFI) for lead and BaP in soil in AOC 16B Area 2 was submitted to USEPA AND NJDEP on April 9, 2020 (Chevron 2020).

AOC 16B Area 3 is within former Tank Basin 755/756 and Tank Basin 765. A justification for NFI for lead and BaP in soil in AOC 16B Area 3 was submitted to USEPA and NJDEP on December 11, 2018 (Chevron 2018) and approved on March 27, 2020 (USEPA 2020).

See the *Engineering Controls* section for additional information on engineering controls used for lead-impacted soil at AOC 16B.

Arsenic-impacted surface soils were removed during the ESS CM implementation in 2017. To address remaining arsenic-impacted surface soil, a NFI report for the AOC 16B/AOC 35 area was submitted to USEPA and NJDEP on April 9, 2019 (Chevron 2019). USEPA provided comments on the NFI request on July 26, 2019 (USEPA 2019). A response to comments was submitted to USEPA and NJDEP on August 13, 2019 (Chevron 2019) and approval was received on September 4, 2019 (USEPA 2019).

An NFA justification for arsenic in AOC 16B – Tank 773 Area groundwater was submitted to USEPA and NJDEP on April 20, 2020 (Chevron 2020).

An ISCO PDI in AOC 16B EY1 (located within Tank Basin 777 and the area west of the basin) was conducted in 2017 to delineate benzene impacts in soil and groundwater. The results from the PDI were incorporated in the October 2018 ISCO IWP for AOC 16 EY1 (Chevron 2018). USEPA and NJDEP provided comments on the IWP in a letter dated March 15, 2019 (USEPA 2019) and Chevron provided responses to the comments on April 9, 2019 (Chevron 2020). Approval of the IWP and the NJPDES permit were received on April 18, 2019 (NJDEP 2019). Implementation of the ISCO CM commenced on April 29, 2019 and was completed on May 24, 2019. Approximately 87 cubic yards of benzene-impacted soil were excavated from two areas. Excavated benzene-impacted soils were disposed of in the Facility's on-site CAMU. Excavated areas were backfilled with certified clean fill material. The ISCO treatment for benzene exceeding the CMI action level targeted a soil layer ranging from 2.5 to 9 feet thick over an approximately 9,000-square-foot area. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 74,750 pounds of calcium hydroxide, 154,280 pounds of sodium persulfate, and 70,528 pounds of potassium persulfate. A CCR/Permit-by-Rule Monitoring Report (PMR) describing the field implementation activities and results of the post-implementation monitoring events was submitted to USEPA and NJDEP on October 21, 2020 (Chevron 2020).

An ISCO PDI in AOC 16 EY3 (located within Tank Basins 750, 751, and 752) was conducted between 2017 and 2018. The results of the AOC 16 EY3 PDI were summarized in the April 2019 NFI justification (Chevron 2019). Approval of NFI was received on February 4, 2020 (USEPA 2020).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 16B include:

- Chevron. 2017. ESS Implementation Work Plan for AOC 16B Area 1. August.
- Chevron. 2018. In Situ Chemical Oxidation Implementation Work Plan for Area of Concern 16 EY1. October.
- Chevron. 2018. Response to USEPA AND NJDEP Comments, Ex Situ Stabilization Work Plan – Area of Concern 16 Area 1. November.
- Chevron. 2018. Justification for No Further Investigation for Lead and BaP in Soil. AOC 16B Area 3. December.
- Chevron. 2019. No Further Investigation Report for Arsenic in Surface Soil: AOC 16B Area 1/35. April.
- Chevron. 2019. Response to USEPA Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 16 EY1, dated October 11, 2018. April.
- Chevron. 2019. Proposal for No Further Investigation or Remediation for Benzene in Soil and Groundwater. Area of Concern 16 EY3. April.
- Chevron. 2020. ESS CCR for AOC 16B Area 1. June.
- Chevron. 2019. Response to USEPA and NJDEP comments. No Further Investigation Justification for Arsenic in Surface Soil at AOC 16B Area 1/35, dated April 11, 2019. August.
- Chevron. 2020. Justification for No Further Action for Arsenic in AOC 16B – Tank 773 Area Groundwater. April.
- Chevron. 2020. Justification for No Further Investigation for Lead and BaP in Soil: AOC 16B Area 2. April.
- Chevron. 2020. No Further Action Justification for Arsenic in Surface Soil: East Yard. June.
- Chevron. 2020. In Situ Chemical Oxidation Construction Completion Report/Permit-by-Rule Monitoring Report for Area of Concern 16 EY1. October.

AOC 16C

AOC 16C in the Central Yard consists of the OWSS. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for soils with BaP concentrations <10 mg/kg and >0.66 mg/kg
- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg in soil
- ISCO treatment for benzene concentrations >I00 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

Benzene-impacted soil associated with AOC 16C was addressed during the excavation of benzene-impacted soil in AOC 25.

AOC 16C is associated with Potential Area of Concern (PAOC) 27 and 29. The BaP-impacted soil in PAOCs 27 and 29 was attributed to historic fill. A letter justifying NFI for ESS in AOC 16C was

submitted to USEPA and NJDEP on June 13, 2018 (Chevron 2018) and approved on February 19, 2019 (USEPA 2019).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 16C include:

- Chevron. 2018. Letter to NJDEP Justification for No Further Investigation for BaP in Soil, Area of Concern 16C. June.

AOC 17

AOC 17 consists of Tank Basin 20 in the Main Yard. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

All deed notices are discussed in the *Deed Notices* section.

AOC 18

AOC 18 consists of Tank Basin 2 in the Main Yard. The area was identified as an AOC based on the observation of petroleum impacted soils during the demolition of Tank 2. Petroleum impacted soils were remediated using excavation and off-site disposal. Analysis of post-excavation soil samples collected at AOC 18 showed no exceedances of the applicable regulatory criteria/standards. Groundwater modeling of PCOCs within this AOC demonstrated no exceedances of the groundwater quality standards (GWQS). NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

AOC 19

AOC 19 consists of the above-ground product pipe-way in the Main Yard. The area was identified as an AOC due to oil stained soil in the pipe-way containment earthen trench. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Continuing LRMs for groundwater

LNAPL remedial measures (LRMs) are currently ongoing at AOC 19.

All deed notices are discussed in the *Deed Notices* section.

AOC 21

AOC 21 is near the corner of Maurer Road and State Street, adjacent to the former Bulk Station. The area was identified as an AOC after potentially contaminated soil was encountered during excavation to locate and repair a leak in the Refinery Fire Water System. Concentrations in soil samples did not exceed the applicable NRDCSCC and non-residential direct contact soil remediation standards

(NRDCSRS). Soil is therefore not a source of contamination to groundwater or to human and environmental receptors. Analyses of groundwater samples collected from temporary well points showed no exceedances of the GWQS, and there were no consistent exceedances of the GWQS in groundwater samples from permanent monitoring well A21TP1. NFA was proposed in the HSWA Permit for both soil and groundwater.

AOC 22

AOC 22 is south of the Shops Building in the Central Yard. The area was identified as an AOC based on groundwater contamination identified during the removal of an underground storage tank in December 1995. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- ISCO treatment for benzene concentrations>100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

In 2013 and 2014, Buckeye, the Facility owner, constructed a ladder track system through AOC 22 which consists of a loading rack and associated railways. Since the ladder track rail system would limit access to the AOC 22 area, the CM was fast tracked before the track system's construction. Excavation of benzene-impacted soil was therefore completed without prior submittal and approval of an IWP. The soil excavation and disposal CM for AOC 22 was implemented from October 18 through October 25, 2013. Approximately 186 cubic yards of benzene impacted soil were excavated from the area and disposed of off site. To confirm benzene concentrations in groundwater in the area, replacement monitoring wells were installed in third quarter 2019. A CCR was submitted to NJDEP and USEPA on July 8, 2020 (Chevron 2020), and an approval was received on September 9, 2020 (USEPA 2020).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 22 include:

- Chevron. 2020. Area of Concern 22 Construction Completion Report. July.

AOC 23

AOC 23 consists of Tank Basin 327 in the North Field. The area was identified as an AOC in 1996 when petroleum impacted soil and groundwater were observed in excavation pits during installation of foundations for aboveground piping. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TCLP lead levels >5 mg/L and total organic lead (TOL) concentrations >2 mg/kg in soil

- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and subsequent filing of a deed notice
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and to evaluate the lead and TOL impacts identified in AOC 23 soil during previous investigations. Given the proximity of AOC 23, AOC 41, and SWMU 18 and the apparent continuity of impacted soil from one area to the next, these three areas were combined and evaluated as one large area. The results of the AOC 23 PDI and the proposed CM for AOC 23 were presented in an ISS/ESS IWP for the combined AOC 23, AOC 41, and SWMU 18 Area (Chevron 2017). NJDEP provided comments on the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP on May 10, 2017 (NJDEP 2017). Chevron submitted responses to NJDEP comments in a letter dated September 21, 2017 (Chevron 2017), and USEPA and NJDEP approved the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP and the responses to NJDEP comments in a letter dated January 11, 2018 (USEPA 2018). ESS was implemented in PAOC 6 from February 6 through April 18, 2017, as proposed in the approved PAOC 6 ESS IWP. ISS and ESS were implemented in AOC 23/41 and SWMU 18 from March 1, 2017, through June 8, 2018, as proposed in the approved AOC 23/41 and SWMU 18 ISS/ESS IWP. Approximately 5,455 cubic yards of soil from the AOC 23/41 and SWMU 18 ESS areas and approximately 855 cubic yards of soil from PAOC 6 ESS areas were stabilized and removed. The stabilized soil was excavated and transported directly to the Facility's on-site CAMU for disposal. Approximately 200 cubic yards of soil in the AOC 23/41 and SWMU 18 ISS areas were stabilized. The AOC 23, AOC 41, SWMU 18, and PAOC 6 CCR was submitted to USEPA and NJDEP on February 20, 2020 (Chevron 2020) and was approved by the USEPA and NJDEP on April 6, 2020 (USEPA 2020).

The benzene-impacted soil was addressed as part of the ISS/ESS IWP. Based on post-implementation groundwater results, a combined CCR/IWP and associated DGW/PBR request was submitted to NJDEP and USEPA on April 22, 2020, to address the remaining benzene-impacted groundwater (Chevron 2020). Two rounds of NJDEP comments were received from NJDEP via email and RTCs, including an IWP Addendum, were submitted to NJDEP on August 12 and 18, 2020 (Chevron 2020). The DGW/PBR permit was received on September 17, 2020 (NJDEP 2020). The ISCO treatment for benzene exceeding the CMI action level targeted a soil layer ranging from 4 to 7 feet thick over an approximately 11,000-square-foot area. Soil mixing commenced on September 21, 2020, and was completed on September 28, 2020. The total quantities of calcium hydroxide and persulfate mixed in soil were in compliance with the PBR/DGW authorization: 102,375 pounds of calcium hydroxide, 204,972 pounds of sodium persulfate, and 90,364 pounds of potassium persulfate.

Arsenic impacts associated with AOC 23 are discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section below.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 23 include:

- Chevron. 2017. ISS and ESS Implementation Work Plan for AOC 23, AOC 41, and SWMU 18. February.
- Chevron. 2017. Response to NJDEP Comments Response Action Item #1 ISS/ESS Implementation Work Plan – AOC 23, AOC 41, SWMU 18. September.
- Chevron. 2020. ISS and ESS Construction Completion Report for AOC 23, AOC 41, SWMU 18, and PAOC 6. February.
- Chevron. 2020. Construction Completion Report/Implementation Work Plan for Area of Concern 23, 41 and Solid Waste Management Unit 18. April.
- Chevron. 2020. Construction Completion Report/Implementation Work Plan Addendum for Area of Concern 23, 41 and Solid Waste Management Unit 18. August.

AOC 24

AOC 24 is northwest of Tank 4 in the Main Yard. The area was identified as an AOC based on a small localized area of petroleum contaminated soil. No exceedances of the applicable criteria were detected in analytic results of soil samples. NFA for groundwater was granted on January 21, 2005

AOC 25

AOC 25 consists of a release at the location of the former cat cracker in the Central Yard. The CMs approved in the HSWA Permit Renewal are:

- Continue LRMs for groundwater, until all the LNAPL is removed to the extent practicable
- ISCO or enhanced bioremediation for benzene concentrations >100 µg/L
- MNA and filing a CEA for groundwater
- NFA is proposed for soil

An IWP for AOC 25 was submitted to USEPA and NJDEP on August 4, 2016, and proposed excavation and disposal of LNAPL-impacted soil to address the LNAPL impacts (Chevron 2016). The IWP was approved by NJDEP on September 28, 2016 (NJDEP 2016). The soil excavation and disposal CM was implemented in AOC 25 from August 30 to September 9, 2016. The implementation areas surrounded monitoring wells MW-0037R, MW-0054, and MW-0055. Approximately 561 cubic yards of LNAPL-impacted soil was excavated and disposed of in the on-site CAMU. A CCR was submitted to USEPA and NJDEP on January 28, 2019, and requested transition to MNA for benzene in groundwater (Chevron 2019). USEPA and NJDEP approved the AOC 25 CCR on April 10, 2019 (USEPA 2019).

LRMs are currently ongoing.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 25 include:

- Chevron. 2016. Implementation Work Plan for Area of Concern 25. August.
- Chevron. 2019. Area of Concern 25 Construction Completion Report. January.

AOC 26

AOC 26 consists of the East Yard Bunker Slab in the East Yard. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- NFA is proposed for groundwater

A combined ISCO PDI for AOC 14 and AOC 26 was initiated in 2015 in conjunction with the EY4b LNAPL PDI. An IWP for AOC 14 and AOC 26 proposed excavation with disposal in the CAMU and compliance averaging to address benzene impacted soil (Chevron 2017). The excavation CM was completed between November 3 and December 13, 2017. Approximately 1,208 cubic-yards of benzene-impacted soils were excavated from the treatment areas, tested (if applicable), transported and disposed of in the on-site CAMU. The areas were then backfilled using certified clean fill. NJDEP and USEPA provided comments on the IWP on November 14, 2019. RTCs were submitted to USEPA and NJDEP on February 13, 2020 (Chevron 2020), and approval was received on March 27, 2020 (USEPA 2020). A CCR was submitted to USEPA and NJDEP on May 5, 2020. Engineering controls associated with AOC 26 are discussed in the *Engineering Controls* section.

An IWP to address arsenic-impacted surface soil in AOCs 14 and 26 and SWMU 26 was submitted to USEPA and NJDEP on October 17, 2019 (Chevron 2019) and approval was received on November 13, 2019 (USEPA 2019). The proposed cap consisted of areas containing existing infrastructure and buildings and areas where a cap will be constructed. The proposed cap was constructed using a visible demarcation consisting of non-woven geotextile fabric overlain by a minimum 1-foot-thick physical barrier of certified clean DGA to address arsenic-impacted surface soil. The CM was completed in March 2020.

LNAPL impacts associated with AOC 26 are discussed in the *LNAPL* section.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to AOC 26 include:

- Chevron. 2017. Implementation Work Plan, Area of Concern 14 and Area of Concern 26. October.
- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil. AOC 14/26 and SWMU 26. October.
- Chevron. 2020. RTCs for Implementation Work Plan, Area of Concern 14 and Area of Concern 26.

- Chevron. 2020. Construction Completion Report for Area of Concern 14/26. May.

AOC 27

AOC 27 consists of an aboveground product pipe-way within Tank Basin 777 in the East Yard. The area was identified as an AOC in October 1998 during a cleanup effort related to a No. 2 fuel oil release. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

The Arsenic Cap FDR was submitted in May 2013 and proposed NFA for arsenic in AOC 27 surface soil. NJDEP approved the FDR in a letter dated June 4, 2014.

AOC 28

AOC 28 is in the footprint of former Tank 719 in the East Yard. It was designated as an LNAPL area after LNAPL was detected in a temporary well point installed during the First Phase groundwater investigation. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA for groundwater which was granted on January 21, 2005

An ISS/ESS PDI was conducted in 2016 to address data gaps and to define the lead impacts identified in AOC 28 soil. The results of the AOC 28 PDI and the proposed CMs for AOC 28 were presented in an ISS/ESS IWP for AOC 28 (Chevron 2017). An addendum to the ISS and ESS IWP for arsenic impacts in soil was submitted to USEPA and NJDEP on March 28, 2018 (Chevron 2018). ISS was the proposed CM to address lead impacts in soil at concentrations greater than 800 mg/kg and TCLP lead concentrations less than 5 mg/L. ESS was the proposed CM to address lead impacts in soil at concentrations greater than 800 mg/kg and TCLP lead concentrations greater than 5 mg/L. Additionally, three areas were proposed to be excavated to 2 feet below ground surface (bgs) to remediate arsenic-impacted soil. The ISS/ESS IWP was approved by NJDEP on July 31, 2017 (NJDEP 2017). USEPA and NJDEP provided comments on the Addendum on August 6, 2018 (USEPA 2018). Chevron provided RTCs on August 21, 2018 (Chevron 2018), and the addendum was approved on October 24, 2018 (USEPA 2018). The ISS, ESS, and arsenic excavation CMs were implemented in AOC 28 from August 30 through September 8, 2017. The capping CM was implemented from November 1 through November 28, 2018. Approximately 101 cubic yards of lead-impacted soil were stabilized in situ (ISS), 204 cubic yards of lead-impacted soil were stabilized and excavated (ESS), and 75 cubic yards of arsenic-impacted surface soil were excavated. ESS and excavated arsenic-impacted soils were disposed of in the Facility's on-site CAMU. Excavated areas were backfilled with certified clean fill material. A cap was constructed in Areas E and G. The cap was comprised of a non-woven geotextile fabric with a minimum 1-foot-thick layer of crushed stone placed on top. A combined ISS/ESS and arsenic cap CCR for AOC 28 was submitted to USEPA and NJDEP on April 30, 2019 (Chevron 2019) and was approved on July 26, 2020 (USEPA 2020).

The AOC 28 LNAPL PDI Summary recommended NFA for LNAPL. USEPA and NJDEP approved the NFA justification on October 13, 2017.

Submittals related to AOC 28 include:

- Chevron. 2017. In situ and Ex situ Stabilization Implementation Work Plan. AOC 28. June.
- Chevron. 2018. Addendum to the ISS and ESS Implementation Work Plan – Appendix B for Arsenic Impacts in Soil at AOC 28. March.
- Chevron. 2018. Response to USEPA/NJDEP Comments, Addendum to AOC 28 ISS and ESS Implementation Work Plan – AOC 28: Areas E and G. August.
- Chevron. 2019. ISS/ESS and Arsenic Cap Construction Completion Report for AOC 28. April.

AOC 29

AOC 29 is in the former 5 Berth Area in the East Yard. The unit was identified as an AOC based on the presence of solid, asphalt-like material and LNAPL. This AOC is a confirmed LNAPL area. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg in soil, followed by completion of a revetment system at the former 5 Berth area
- Filing of a deed notice

An ISS/ESS PDI was conducted in 2015 and 2016 to address data gaps and to evaluate lead and BaP impacts identified in AOC 29 soil during previous investigations. The results of the AOC 29 PDI and the proposed CMs for AOC 29 were presented in an ISS/ESS IWP for AOC 29 dated July 29, 2016 (Chevron 2016). NJDEP approved the AOC 29 ISS/ESS IWP in a letter dated September 28, 2016 (NJDEP 2016). The ISS and ESS CMs were implemented in AOC 29 from August 12 to October 5, 2016. A total of 3,519 cubic-yards of ISS soil were stabilized, and 133 cubic-yards of ESS soil were stabilized, excavated and disposed of in the on-site CAMU. The ESS excavation areas were backfilled with certified clean fill material. A CCR recommending NFA for lead and BaP in soil was submitted to USEPA and NJDEP on February 8, 2018 (Chevron 2018). On December 6, 2018, USEPA and NJDEP provided conditional approval of the AOC 29 ISS/ESS CCR pending submittal of acceptable response to agency comments (USEPA 2018). Chevron submitted responses to USEPA and NJDEP comments on August 5, 2019 (Chevron 2019) and USEPA and NJDEP approved the AOC 29 ISS/ESS CCR and the response to comments on August 23, 2019 (USEPA 2019).

Construction of the 5 Berth revetment system primarily consisted of excavation and grading of the side slopes; installation of marine mattresses on the graded slopes; and demolition of the existing timber structures along the east and north sides of 5 Berth. Approximately 500 feet of the shoreline along the east and north sides of 5 Berth were excavated and graded, and marine mattresses were installed on the graded slopes. The construction of the 5 Berth revetment system commenced in November 2012 and was substantially completed by early March 2013. In summer of 2013, bulging of the marine mattress was observed along two isolated sections on the east side of 5 Berth. In May and June of 2014, repairs including additional excavation and marine mattress placement were implemented along an approximately 190-foot length of the east side of 5 Berth to manage the lateral bulging. The total estimated excavated volume during construction was approximately 6,355 cubic yards. Another 340 cubic yards were excavated during the repairs. Chevron submitted a CCR for

the 5 Berth Revetment System on July 30, 2015 (Chevron 2015) and the CCR was approved by NJDEP on August 25, 2015 (NJDEP 2015).

Material associated with the LNAPL area within AOC 29 was removed as part of the construction of the 5 Berth Revetment. LRMs are ongoing.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to AOC 29 include:

- Chevron. 2015. Construction Completion Report – 5 Berth Revetment System. July.
- Chevron. 2016. In situ and Ex situ Stabilization Implementation Work Plan. AOC 29. July.
- Chevron. 2018. ISS/ESS CCR for AOC 29. February.
- Chevron. 2019. Response to USEPA/NJDEP Comments. ISS and ESS Construction Completion Report for AOC 29. August.

AOC 30

AOC 30 consists of the Tank 27 pipe way in the Central Yard. This area was identified as an AOC because stained soils were observed in the area. Petroleum impacted soils have been removed from AOC 30, and post-excavation sampling analytical results showed no exceedances of the applicable NRDCSCC and NRDCSRS. Analyses of samples collected from MW-130 have shown no exceedances of the GWQS for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). There have been intermittent exceedances for metals. Per the HSWA Permit, NFA was proposed and granted for both soil and groundwater.

AOC 31

AOC 31 is in the vicinity of a former pump within Tank Basin 772 in the East Yard. The area was identified as an AOC when stained soils were observed during regrading activities conducted within the tank basin. This AOC is a confirmed LNAPL area. The CMs approved in the HSWA Permit Renewal are:

- ERH and SVE for organic contaminants in soil, contaminated groundwater, and LNAPL
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- ISS for lead in soil and filing a deed notice afterwards
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required, until all the LNAPL is removed to the extent practicable

AOC 31 is subdivided into three subareas:

- AOC 31 ERH - in the northwest corner of Tank Basin 770 south of King Street
- AOC 31 North - is north of AOC 31 ERH and encompasses King Street and portions of Tank Basins 772 and 773
- AOC 31 South - within the southeastern portion of Tank Basin 770

<u>AOC 31 ERH</u>

An ERH treatment was completed between May and October 2014, and the ERH Completion Report was submitted to the USEPA and NJDEP in December 2016 (Chevron 2016). A supplemental IWP for biosparging in the AOC 31 ERH Area was submitted to USEPA and NJDEP on November 29, 2017 (Chevron 2017). USEPA provided comments in a June 2018 letter (USEPA 2018). Chevron submitted a response to the USEPA comments on September 11, 2018 (Chevron 2018) and received approval on October 12, 2018 (USEPA 2018). The biosparge system began operating in fourth quarter 2018.

AOC 31 North

A biosparge pilot study was implemented In AOC 31 North (eastern portion of Tank Basin 772) between October 2008 and February 2011 to evaluate the effectiveness of the technology to meet shallow groundwater remedial goals. A status report was submitted to USEPA and NJDEP in September 2011. The report indicated that benzene impacts may have migrated to the intermediate and deep groundwater zones below AOC 31. An ISCO PDI within AOC 31 North commenced in 2016 to delineate the benzene impacts within the soil and deep groundwater. An ISCO IWP and two DGW/PBR requests (one for Tank Basin 772/773 and one for King Street) were submitted to USEPA and NJDEP in April 2018 (Chevron 2018). NJDEP provided comments on June 22, 2018 (NJDEP 2018), and Chevron provided a response to the NJDEP comments on June 27, 2018 (Chevron 2018). The DGW/PBR permits were received on July 3, 2018 (NJDEP 2018). The injection event at the King Street treatment area was initiated on July 30 and completed on November 14, 2018. A combined volume of 189,790 gallons of ISCO reagents were injected at the King Street treatment area. The reagents included approximately 36,992 gallons of 25% sodium hydroxide and 152,798 gallons of 18.5% sodium persulfate (approximately 268,928 pounds). The injection event at the Tank Basin 772/773 treatment area was initiated on October 23 and completed on November 14, 2018. A combined volume of 32,209 gallons of ISCO reagents were injected. The reagents included 9,507 gallons of 25% sodium hydroxide and 24,702 gallons of 18.5% sodium persulfate (approximately 43,476 pounds).The extent of the area treated using ISCO injections was approximately 8,000 square feet in the Tank Basin 772/773 treatment area and approximately 9,000 square feet in the King Street treatment area. The treatment interval within the Tank Basin 772/773 area was between 19 and 38 feet bgs, and the treatment interval within the King Street treatment area was between 11 and 29 feet bgs. A PMR was submitted to USEPA and NJDEP on July 8, 2020 (Chevron 2020), and approval was received on September 30, 2020 (USEPA 2020).

AOC 31 South

An ISCO PDI was conducted within AOC 31 South in 2015 and 2016 to investigate the benzene impacts in soil and groundwater. An ISCO IWP and associated DGW/PBR request were submitted to USEPA and NJDEP in January 2017 (Chevron 2017). NJDEP provided comments on the IWP in emails dated March 24 and April 20, 2017. Chevron submitted responses to both rounds of NJDEP comments on April 7 and 25, 2017 (Chevron 2017). The NJDEP DGW/PBR permit was received in May 2017 (NJDEP 2017). The ISCO injections were completed in an area measuring approximately 7,500 square feet. The injection event was initiated on August 8 and completed on October 9, 2017. A combined volume of 102,750 gallons of ISCO reagents were injected. The reagents included

20,000 gallons of 25% sodium hydroxide and 82,750 gallons of 18.5% sodium persulfate (141,712 pounds). Based on the results of post-implementation sampling, a combined PMR/IWP and associated DGW/PBR proposal for an additional round of ISCO injections was submitted to USEPA and NJDEP on August 1, 2019 (Chevron 2019). NJDEP provided comments via email on August 21, 2019, and Chevron submitted a response to the NJDEP comments on August 23, 2019 (Chevron 2019). The additional DGW/PBR permit was received on September 3, 2019 (NJDEP 2019). The injection of approved reagents was initiated on September 20 and completed on October 22, 2019. A combined volume of 20,015 gallons of ISCO reagents were injected. The reagents included 3,816 gallons of 25% sodium hydroxide and 16,195 gallons of 18.5% sodium persulfate (approximately 28,555 pounds). A PMR was submitted to USEPA and NJDEP on October 8, 2020 (Chevron 2020).

A request for NFA for arsenic in AOC 31 groundwater was submitted to USEPA and NJDEP on June 24, 2020 (Chevron 2020).

The PDI fieldwork and delineation of arsenic-impacted surficial soil was completed in 2018. An IWP to address arsenic- and lead-impacted surface soil in AOC 31 was submitted to USEPA and NJDEP on June 5, 2019 (Chevron 2019), and the IWP was approved on August 23, 2019 (USEPA 2019). The cap was constructed between November 19 and November 25, 2019. A CCR describing the CMI in AOC 31 was submitted to USEPA and NJDEP on April 8, 2020 (Chevron 2020). The CCR requested an NFA determination for arsenic- and lead-impacted surface soil.

Additional details on an NFA request for lead-impacted soil in AOC 31 is included in the *Engineering Controls* section.

Submittals related to AOC 31 include:

- Chevron. 2016. ERH Completion Report, AOC 31 ERH Construction Completion Report. December.
- Chevron. 2017. In Situ Chemical Oxidation Implementation Work Plan. Area of Concern 31 South. January.
- Chevron. 2017. Letter to NJDEP, Response to Comments, ISCO IWP AOC 31 South, Round 1. April.
- Chevron. 2017. Email to NJDEP, Response to Comments, ISCO IWP AOC 31 South, Round 2. April.
- Chevron. 2017. Supplemental Bioremediation Implementation Work Plan Area of Concern 31 (ERH Area). November.
- Chevron. 2018. In Situ Chemical Oxidation Implementation Work Plan AOC 31 North. April.
- Chevron. 2018. Email to NJDEP. FW- Chevron – April 2018 AOC 31 N (Tank 772/773 and King Street) Work Plan and PBR Proposal. June.
- Chevron. 2018. Response to USEPA and NJDEP Comments on the Supplemental Bioremediation Implementation Work Plan, AOC 31, ERH Area, dated November 29, 2017. September.
- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 31. June.

- Chevron. 2019. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report/Implementation Work Plan for Area of Concern 31 South. August.
- Chevron. 2020. Arsenic Cap CCR for AOC 31. April.
- Chevron. 2020. Justification for NFA for Arsenic in AOC 31 Groundwater. June.
- Chevron. 2020. ISCO Permit-by-Rule Monitoring Report for AOC 31N. July.
- Chevron. 2020. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report for Area of Concern 31S. October.

AOC 32

AOC 32 consists of Tank Basin 16 in the Central Yard. The applicable regulatory soil criteria/standards were not exceeded in any of the analytical results for soil samples. Soils are not a source of contamination to groundwater or human and other environmental receptors. Groundwater modeling of PCOCs within AOC 32 demonstrated no exceedances. NFA was proposed in the HSWA Permit for both soil and groundwater.

AOC 33

AOC 33 consists of Tank Basin 314 in the Main Yard. The area was identified as an AOC in 2000 based on an apparent release from a tank. The CMs approved in the HSWA Permit Renewal are:

- ISS for lead in soil and filing a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2013 to address data gaps and to define the lead impacts identified in AOC 33 soil during previous investigations. The results of the AOC 33 PDI and the proposed CM for AOC 33 were presented in the ISS IWP for AOC 33 (Chevron 2015). The ISS IWP was approved by NJDEP on December 22, 2015 (NJDEP 2015). The ISS CM for AOC 33 was implemented on December 2 and 3, 2015, as proposed in the NJDEP-approved ISS IWP for AOC 33. A design mix consisting of 2% Enviroblend® 80/20 (by weight of soil) was used to stabilize the nonhazardous lead-impacted soils in AOC 33. A total of 762 cubic yards of soil was treated in AOC 33. The AOC 33 CCR was submitted to USEPA and NJDEP in June 2017 (Chevron 2017). NJDEP approved the CCR on July 5, 2017 (NJDEP 2017).

A letter justifying NFA for arsenic-impacted surficial soil was submitted to USEPA and NJDEP on June 18, 2018 (Chevron 2018) and was approved on November 2, 2018 (USEPA 2018).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 33 include:

- Chevron. 2015. ISS Implementation Work Plan for Area of Concern 33. November.
- Chevron. 2017. In Situ Stabilization Construction Completion Report, AOC 33. June.

- Chevron. 2018. Letter to NJDEP. NFA Justification for Arsenic in Surface Soil at AOC 33. June.

AOC 34

AOC 34 consists of Tank Basin 315 in the Main Yard. The area was identified as an AOC in 2000 based on an apparent release noted in inspection records. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

The Arsenic Cap FDR was submitted in May 2013 and proposed NFA for arsenic in AOC 34 surface soil. NJDEP approved the FDR in a letter dated June 4, 2014.

AOC 35

AOC 35 consists of Tank Basin 771 in the East Yard. Except for two slight exceedances of arsenic in soil, there are no exceedances of the applicable NRDCSCC and NRDCSCS. There have been no impacts to groundwater in the vicinity of AOC 35. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- NFA was proposed and has been granted for groundwater

An NFI report for arsenic in surface soil in the AOC 16B/AOC 35 area was submitted to USEPA and NJDEP on April 9, 2019 (Chevron 2019). USEPA provided comments letter on the NFI request on July 26, 2019 (USEPA 2019). A response to comments was submitted to USEPA and NJDEP on August 13, 2019 (Chevron 2019) and approval was received on September 4, 2019 (USEPA 2019).

Submittals related to AOC 35 include:

- Chevron. 2019. No Further Investigation Report for Arsenic in Surface Soil: AOC 16B Area 1/35. April.
- Chevron. 2019. Response to USEPA AND NJDEP comments. No Further Investigation Justification for Arsenic in Surface Soil at AOC 16B Area 1/35, dated April 11, 2019. August.
- Chevron. 2020. No Further Action Justification for Arsenic in Surface Soil: East Yard. June.

AOC 36

AOC 36 is in the southern portion of the Central Yard. The area was identified as an AOC based on the detection of chlorinated hydrocarbons in groundwater during the RFI. The CMs approved in the HSWA Permit Renewal are:

- EISB including bioaugmentation for 1,1-dichloroethene and trichloroethylene greater than 100 µg/L in on-site groundwater

- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An EISB PDI was conducted in 2012 to further evaluate chlorinated VOC concentrations in and around MW-217. An IWP for the MW-217 area in AOC 36 was submitted to USEPA and NJDEP in June 2012 (Chevron 2012). NJDEP issued comments on the IWP in an email dated September 13, 2012, and Chevron provided RTCs on October 3, 2012 (Chevron 2012). A DGW/PBR permit was received on October 11, 2012 (NJDEP 2012). The EISB injections were completed on November 9, 2012. The following total quantities of EISB amendments were injected: 20,020 gallons of anoxic water, 500 gallons (4,165 pounds) of Newmans Zone® EVO (emulsified vegetable oil), 80 gallons (666 pounds) of WilClear® sodium lactate product, 800 gallons (6,664 pounds) of Neutral Zone® pH buffer, and 40 liters of KB-1® bioaugmentation culture. A PMR for the MW-217 area was submitted to USEPA and NJDEP in July 2013 (Chevron 2013).

The area around MW-216, MW-220, and MW-169R was confirmed as a second area requiring EISB implementation. A PDI was conducted in this area in 2013, and an IWP for the MW-216/MW-220 and MW-169R areas was submitted to USEPA and NJDEP in July 2013 (Chevron). NJDEP issued comments on the IWP in an email dated August 15, 2013, and Chevron provided a response to comments on September 9, 2013 (Chevron 2013). NJDEP issued the DGW/PBR permit on September 13, 2013 (NJDEP 2013). The target EISB treatment zone in the MW-169R area was 195 feet wide (north-south dimension), 20 feet thick (vertical dimension), and an average of 26 feet long (east-west dimension). The target EISB treatment zone in the MW-216/220 area was 172 feet wide (north-south dimension), 15 feet thick (vertical dimension), and an average of 27 feet long (east-west dimension). The injection activities in the MW-169R area were conducted between October 16 and November 22, 2013. The injection activities in the MW-216/220 area were initiated on December 2, 2013. However, due to below-freezing temperatures in the 2013-2014 winter months, the injection activities were temporary suspended in the MW-216/MW-220 area from December 20, 2013, through March 18, 2014. Injections were completed on April 3, 2014. The following total quantities of EISB amendments were injected in the MW-169R Area: 79,000 gallons of the anoxic water, 1,848 gallons (15,246 pounds total weight) of Newman Zone® EVO, 308 gallons (3,388 pounds total weight) of WilClear® sodium lactate product, 3,300 gallons (39,930 pounds total weight) of Neutral Zone® pH buffer, and 176 liters of KB-1® bioaugmentation culture. The following total quantities of EISB amendments were injected at in the MW-216/MW-220 area: 57,000 gallons of the anoxic water, 1,786 gallons (14,735 pounds total weight) of Newman Zone® EVO, 285 gallons (3,135 pounds total weight) of WilClear® sodium lactate product, 2,280 gallons (27,588 pounds total weight) of Neutral Zone® pH buffer, and 114 liters of KB-$^{1®}$ bioaugmentation culture. A PMR for the MW-216, MW-220, and MW-169R Areas was submitted to USEPA and NJDEP in February 2015 (Chevron 2015).

Field Sampling Plans for EISB groundwater performance monitoring were submitted to USEPA and NJDEP in January 2015, January 2016, and May 2017. These plans outlined the basis, general approach, and proposed scope of work for field activities associated with groundwater performance monitoring of the EISB injection areas in AOC 36 (Chevron 2015, 2016, and 2017).

An additional PDI was conducted in 2017 to evaluate chlorinated VOCs detected in and around MW-367. An AOC 36 EISB IWP for the MW-216, MW-220 and MW-367 areas was submitted in May 2018 (Chevron 2018) and the NJDEP DGW/PBR permit was received on June 14, 2018 (NJDEP 2018). The target EISB treatment zone in the MW-216/220 area was 170 feet wide (north-south dimension), 15 feet thick (vertical dimension), and an average of 33 feet long (east-west dimension). The target treatment zone in the MW-367 area was 90 feet wide (north-south dimension), 15 feet thick (vertical dimension), and an average of 33 feet long (east-west dimension). Between July 2018 and October 2018, approximately 74,520 gallons of substrate were injected in the MW-216/220 area, and approximately 40,688 gallons of substrate mixture were injected in the MW-367 area. The substrate mixture included anoxic water, EVO, sodium lactate, pH buffer, and bioaugmentation culture. A PMR describing the field implementation activities and post-injection monitoring results was submitted to NJDEP/USEPA on September 13, 2019 (Chevron 2019).

An NFA justification for arsenic in AOC 36 groundwater was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 36 include:

- Chevron. 2012. Enhanced In Situ Bioremediation of Chlorinated Compounds Implementation Work Plan – MW-217 Area, Area of Concern 36. June.
- Chevron. 2012. Response to NJDEP Comments on Chevron's AOC 36 Permit-by-Rule Proposal for Enhanced In Situ Bioremediation (NJDEP's email dated September 13, 2012) and Addendum to the August 1, 2012 EISB Implementation Work Plan for MW-217. October.
- Chevron. 2013. Discharge to Groundwater (DGW)/Permit-by-Rule (PBR) Monitoring Report for Enhanced In Situ Bioremediation (EISB), Area of Concern 36 – MW-217 Area. July.
- Chevron. 2013. Request for Permit-by-Rule/Discharge to Groundwater Permit, Enhanced In Situ Bioremediation (EISB) Implementation Work Plan – MW-216/MW-220 and MW-169R Areas. July.
- Chevron. 2013. Response to NJDEP email, dated August 15, 2013 on Chevron's Enhanced In situ Bioremediation (EISB) Implementation Work Plan – MW-216, MW-220, and MW-169R Areas. September.
- Chevron. 2015. Field Sampling Plan – EISB Groundwater Performance Monitoring. Area of Concern 36. January.
- Chevron. 2015. Discharge to Groundwater (DGW)/Permit-by-Rule (PBR) Monitoring Report for Enhanced In Situ Bioremediation (EISB), Area of Concern 36 – MW-216, MW-220, and MW-169R Areas. February.
- Chevron. 2016. Field Sampling Plan – EISB Groundwater Performance Monitoring. Area of Concern 36. January.
- Chevron. 2017. Field Sampling Plan – EISB Groundwater Performance Monitoring. Area of Concern 36. May.
- Chevron. 2018. Enhanced In Situ Bioremediation Implementation Work Plan, MW-216/MW-220 and MW-367 Areas, Area of Concern 36. May.

- Chevron. 2019. Discharge to Groundwater/Permit-by-Rule Monitoring Report for Enhanced In Situ Bioremediation (EISB), Area of Concern 36, MW-216/MW-220 and MW-367 Areas. September.
- Chevron. 2020. Letter. Justification for NFA for Arsenic in AOC 36 Groundwater. March.

AOC 37

AOC 37 is at the East Yard Gasoline Filters. AOC 37 was identified as an AOC based on the results of the PAOC site investigation conducted in December 2002. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- ISS for lead in soil and filing a deed notice afterwards

An ISCO PDI was conducted in AOC 37 in 2014 and 2015. Following completion of the PDI, an IWP for the excavation of benzene-impacted soils was submitted to the NJDEP in July 2016 (Chevron 2016). NJDEP comments on the IWP were to be addressed in the CCR. The soil excavation and disposal CM for AOC 37 was implemented between August 4 and August 11, 2016. Nearly 300 cubic yards of benzene-impacted soil were excavated from AOC 37 and disposed of in the on-site CAMU. The area was backfilled using certified clean fill. A CCR was submitted to the USEPA and NJDEP on December 6, 2018 (Chevron 2018), and USEPA provided comments on the AOC 37 CCR on April 5, 2019 (USEPA 2019). The revised CCR was submitted to USEPA and NJDEP on May 29, 2020 (Chevron 2020). In the CCR, Chevron requested an NFA determination for benzene in soil and a transition to MNA for benzene in groundwater.

Chevron submitted an NFA request for lead in soil on December 1, 2016 (Chevron 2016). NJDEP provided comments on the AOC 37 NFA letter on January 13, 2017 (NJDEP 2017), and a response was submitted on May 29, 2020 (Chevron 2020).

Submittals related to AOC 37 include:

- Chevron. 2016. Corrective Measure Implementation Work Plan, Area of Concern 37. July.
- Chevron. 2016. Justification for No Further Action for Lead in Soil. Area of Concern 37. December.
- Chevron. 2018. Construction Completion Report for Area of Concern 37. December.
- Chevron. 2020. Response to USEPA AND NJDEP Comments. Justification for NFA for Lead in Soil, AOC 37. May.
- Chevron. 2020. CCR for AOC 37 – Rev1. May.

AOC 38

AOC 38 is at the loading manifold and the G180/181 naphtha pumps in the East Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISCO PDI was conducted in 2015. An IWP for the remediation of benzene impacts was submitted to the USEPA and NJDEP on September 6, 2017 (Chevron 2017). The soil excavation and disposal CM for AOC 38 was implemented from October 2 through October 4, 2017. Approximately 180 cubic yards of benzene impacted soil were excavated from AOC 38 and disposed in the Facility's CAMU. USEPA and NJDEP provided comments on the IWP in a letter dated March 16, 2018 (USEPA 2018). A CCR was submitted to USEPA and NJDEP on April 30, 2019 (Chevron 2019). The CCR addressed the USEPA and NJDEP comments on the IWP and recommended NFA for benzene in soil and additional groundwater monitoring. USEPA provided comments on the AOC 38 CCR on July 23, 2019 (USEPA 2019). RTCs were submitted to USEPA and NJDEP on April 15, 2020 (Chevron 2020), and approval of the CCR was received on April 21, 2020 (USEPA 2020).

In conjunction with AOC 39, a PDI was conducted in 2019 to determine the nature and extent of arsenic-impacted surface soil. The IWP was submitted on July 31, 2019 (Chevron 2019) and USEPA approval was received on August 23, 2019 (USEPA 2019). The capping corrective measure was completed between January 20 and February 19, 2020.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to AOC 38 include:

- Chevron. 2017. Implementation Work Plan. Area of Concern 38. September.
- Chevron. 2019. Area of Concern 38 Construction Completion Report. April.
- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 38/39. July.

AOC 39

AOC 39 is at the former East Yard Pump House and the PRC Loading Rack. The area was identified as an AOC based on the results of a PAOC site investigation conducted in December 2002. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

An ISCO PDI for AOC 39 commenced in 2015. An IWP for implementation of excavation and EISB CMs to remediate benzene impacts in soil and groundwater was submitted to the USEPA and NJDEP on October 6, 2017 (Chevron 2017). USEPA approved the IWP with comments to be addressed in the CCR/PMR in a letter dated November 7, 2017 (USEPA 2017), and NJDEP issued the Permit-by-Rule Discharge Authorization on November 9, 2017 (NJDEP 2017). The excavation CM was implemented from October 10 to 24, 2017, and on January 15, 2018. Approximately 464 cubic yards of impacted soil were excavated from AOC 39 and disposed of in the on-site CAMU. Soil

amendments were applied to treat groundwater on December 18 and 19, 2017, and May 14, 2018. A total of 6,400 pounds of gypsum, 800 pounds of ammonium nitrate (with less than 250 pounds of available nitrogen), and 800 pounds of diammonium phosphate (with less than 200 pounds of available phosphorous) were applied to AOC 39. A PMR was submitted to USEPA and NJDEP on November 3, 2020 (Chevron 2020). The PMR recommended NFI for benzene in soil and transitioning AOC 39 to MNA for benzene in groundwater.

In conjunction with AOC 38, a PDI was conducted in 2019 to determine the nature and extent of arsenic-impacted surface soil. The IWP was submitted on July 31, 2019 (Chevron 2019), and USEPA approval was received on August 23, 2019 (USEPA 2019). The capping CM was completed between January 20 and February 19, 2020.

Submittals related to AOC 39 include:

- Chevron. 2017. Implementation Work Plan for Area of Concern 39. October.
- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 38/39. July.
- Chevron. 2020. The Excavation and Enhanced In situ Bioremediation Corrective Measure Permit-by-Rule Monitoring Report for Area of Concern 39. November.

AOC 40

AOC 40 is at Tank Basin 22 in the Central Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

The Arsenic Cap FDR was submitted in May 2013 and proposed NFA for arsenic in AOC 40 soil. NJDEP approved the FDR in a letter dated June 4, 2014.

All deed notices are discussed in the *Deed Notices* section.

AOC 41

AOC 41 is at Tank Basin 300 in the North Field. The area was identified as an AOC based on the results of a PAOC site investigation of the area conducted in May 2003. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for benzene in soil, supplemented by enhanced bioremediation, if required
- ISS for lead in soil and filing a deed notice afterwards
- Excavation, ESS and disposal in the CAMU for tetraethyl lead (TEL) concentrations >2 mg/kg in soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required, until all the LNAPL is removed to the extent practicable
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and to define the lead and TEL impacts identified in AOC 41 soil during previous investigations. Given the proximity of AOC 23, AOC 41, and SWMU 18 to each other and the apparent continuity of impacted soil from one area to the next, these three areas were combined and evaluated as one large area. The results of the AOC 41 PDI and the proposed CM for AOC 41 were presented in an ISS/ESS IWP for the combined AOC 23, AOC 41, and SWMU 18 Area (Chevron 2017). NJDEP provided comments on the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP on May 10, 2017 (NJDEP 2017). Chevron submitted responses to NJDEP in a letter dated September 21, 2017 (Chevron 2017) and USEPA and NJDEP approved the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP and the responses to NJDEP comments in a letter dated January 11, 2018 (USEPA 2018). ISS and ESS were implemented in AOC 23/41 and SWMU 18 from March 1, 2017, through June 8, 2018, as proposed in the approved AOC 23/41 and SWMU 18 ISS/ESS IWP. Approximately 5,455 cubic yards of soil from the AOC 23/41 and SWMU 18 ESS areas, and approximately 855 cubic yards of soil from PAOC 6 ESS areas were stabilized and removed. The stabilized soil was excavated and transported directly to the Facility's on-site CAMU for disposal. Approximately 200 cubic yards of soil in the AOC 23/41 and SWMU 18 ISS areas were stabilized. The AOC 23, AOC 41, SWMU 18, and PAOC 6 CCR was submitted to USEPA and NJDEP on February 20, 2020 (Chevron 2020) and was approved by the USEPA and NJDEP on April 6, 2020 (USEPA 2020).

The benzene-impacted soil was addressed as part of the ISS/ESS IWP. Based on post-implementation groundwater results, a combined CCR/IWP and associated DGW/PBR was submitted to NJDEP and USEPA on April 22, 2020, to address the remaining benzene-impacted groundwater (Chevron 2020). Two rounds of NJDEP comments were received from NJDEP via email and RTCs, including an IWP Addendum, were submitted to NJDEP on August 12 and 18, 2020 (Chevron 2020). A NJDEP DGW/PBR permit was received on September 17, 2020 (NJDEP 2020). The ISCO treatment for benzene exceeding the CMI action level targeted a soil layer ranging from 4 to 7 feet thick over an approximately 11,000-square-foot area. Soil mixing commenced on September 21, 2020, and was completed on September 28, 2020.The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 102,375 pounds of calcium hydroxide, 204,972 pounds of sodium persulfate, and 90,364 pounds of potassium persulfate.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 41 include:

- Chevron. 2017. ISS and ESS Implementation Work Plan for AOC 23, AOC 41, and SWMU 18. February.
- Chevron. 2017. Response to NJDEP Comments Response Action Item #1 ISS/ESS Implementation Work Plan – AOC 23, AOC 41, SWMU 18. September.
- Chevron. 2020. ISS and ESS Construction Completion Report for AOC 23, AOC 41, SWMU 18, and PAOC 6. February.
- Chevron. 2020. Construction Completion Report/Implementation Work Plan Addendum for Area of Concern 23, 41 and Solid Waste Management Unit 18. August.

AOC 42

AOC 42 is in Tank Basin 310 in the Main Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in December 2002. Soil and groundwater modeling demonstrated no exceedances.

AOC 43

AOC 43 is in Tank Basin 311 in the Main Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in December 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA is proposed for groundwater

All deed notices are discussed in the *Deed Notices* section.

AOC 44

AOC 44 is in Tank Basin 313 in the North Field. The area was identified as an AOC based on the results of a PAOC site investigation of the area conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Continuation of LRMs for groundwater
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

An ISCO IWP associated DGW/PBR discharge request at AOC 44 was submitted to USEPA and the NJDEP in October 2012 (Chevron 2012). Based on the NJDEP comments, a revised IWP (Revision 1) was submitted to USEPA and NJDEP in October 2013 (Chevron 2013). The DGW/PBR permit was received from NJDEP on November 20, 2013 (NJDEP 2013). The discharge of approved reagents was initiated on December 13, 2013, and completed on May 30, 2014.The targeted areal extent of benzene impacted groundwater was approximately 32,000 square feet. The average vertical interval was 7 feet (ranging from 5 to 9 feet) from the top of the groundwater table (at 1 to 5 feet bgs) to the top of the Clay Horizon A or glacial till (at 6 to 14 feet bgs). A combined volume of 75,976 gallons of ISCO reagents were injected during the event, including 27,938 gallons of 25% sodium hydroxide and 48,038 gallons of sodium persulfate at a concentration of 326 g/L (159,440 pounds). A PMR was submitted to USEPA and NJDEP in January 2016 recommending additional groundwater monitoring (Chevron 2016). Performance monitoring data were included in a Long-Term Monitoring Report (LTMR) for AOC 44. The AOC 44 LTMR was submitted to USEPA and NJDEP on August 29, 2017 (Chevron 2017). Based on the results of the post-implementation groundwater monitoring events, an additional PDI was conducted within AOC 44 to delineate the LNAPL extents and the remaining benzene-impacted

groundwater. A supplemental IWP for excavation and EISB injections was submitted to USEPA and NJDEP on October 23, 2019 (Chevron 2019), and approval was received on March 4, 2020 (USEPA 2020). The DGW/PBR permit was received from NJDEP on February 19, 2020 (NJDEP 2020). The excavation CM was implemented between November 5 and 15, 2019. Approximately 890 cubic yards of benzene-impacted soil were excavated from AOC 44 between 1.5 and 9.5 feet bgs. Excavated benzene-impacted soils were disposed of in the on-site CAMU. Excavated areas were backfilled with certified clean fill material. The injection of approved reagents was initiated on April 28 and completed on June 4, 2020. On April 29, 2020, Chevron requested and received approval to inject an additional 736 pounds of ferrous sulfate (1,700 pounds total). The areal extent that was treated using EISB injections was approximately 10,500 square feet. The subsurface depth interval targeted for EISB treatment varied between 1 and 10 feet bgs. A combined substrate mixture of 10,893 gallons was injected in the AOC 44 treatment area. The substrate included 74 pounds of KB-1® Primer, 1,700 pounds of ferrous sulfate, and 500 pounds of sodium bicarbonate. Additionally, 145 liters of DGG-B™ culture were injected into the treatment area.

LRMs are currently ongoing.

Arsenic impacts are discussed in the *Main Yard Arsenic Impacted Surficial Soil* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to AOC 44 include:

- Chevron. 2012. In Situ Chemical Oxidation Implementation Work Plan. Area of Concern 44. October.
- Chevron. 2013. In Situ Chemical Oxidation Implementation Work Plan. Area of Concern 44. Revision 1. October.
- Chevron. 2016. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report. Area of Concern 44. January.
- Chevron. 2017. In situ Chemical Oxidation Long-Term Monitoring Report, Area of Concern 44. August.
- Chevron. 2019. Enhanced In Situ Bioremediation Implementation Work Plan. Area of Concern 44. October.

AOC 45

AOC 45 is in Tank Basin 748 in the East Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An AOC 45/46 PDI was conducted in 2014, and a Treatability Study was performed in Third and Fourth Quarter 2014. An ISCF Pilot Test IWP and DGW/PBR request was submitted in Fourth Quarter 2014. A phased investigation was proposed to further delineate the extent of arsenic-

impacted groundwater. An IWP for the implementation of a corrective measure to address arsenic impacts in AOC 45/46 groundwater was submitted to USEPA and NJDEP on September 4, 2019 (Chevron 2019). Chevron received approval of the AOC 45/46 IWP from USEPA, as well as comments on the IWP, in a letter dated October 29, 2019 (USEPA 2019). A response to USEPA comments on the IWP was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020). The construction of the PRB wall began in November 2019 and was completed in January 2020. Due to the presence of utilities and other obstructions encountered along the length of the adjusted PRB wall alignment, the PRB wall has seven gaps totaling 61.5 feet. With the field adjustment to the PRB wall alignment and the 61.5 feet of gaps, the total length of PRB wall installed in AOC 45/46 is 470.5 feet. A mixture of ZVI and certified clean sand was used as the reactive media for the construction of the PRB wall. Based on the revised PRB wall alignment and utilities and other obstructions encountered along the PRB wall alignment, a total of 470.5 feet of PRB wall was installed and a total of 246 tons (492,000 pounds) of ZVI was used to construct the PRB wall in AOC 45/46.

A PDI was conducted in AOCs 45 and 46 in 2019 to determine the nature and extent of arsenic-impacted surface soil. An IWP to address arsenic impacted surface soil was submitted to USEPA and NJDEP in January 2020 (Chevron 2020). The capping CM was implemented in AOCs 45 and 46 between February 20 and March 20, 2020.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to AOC 45 include:

- Chevron. 2019. In Situ Chemical Fixation Implementation Work Plan, Area of Concern 45/46. September.
- Chevron. 2020. Implementation Work Plan to Address Arsenic Impacted Surface Soil. January.
- Chevron. 2020. Response to USEPA AND NJDEP Comments. ISCF IWP for AOC 45/46. March.

AOC 46

AOC 46 is in Tank Basins 749 and 780 in the East Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Excavation, ESS and disposal in the CAMU for TCLP lead levels >5 mg/L
- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and filing a deed notice afterwards
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISCO PDI was conducted in 2013 and 2014. An IWP was submitted to USEPA and NJDEP in February 2015 (Chevron 2015). The injection of approved reagents was initiated on November 6 and completed on December 12, 2015. The ISCO treatment for benzene exceeding the CMI action level targeted an approximately 1,250-square-foot area, and a 7-foot vertical interval ranging from 5.0 to 12.0 feet bgs or 6.0 to 13.0 feet bgs. A combined volume of 9,041 gallons of ISCO reagents were injected. The reagents included 1,998 gallons of 25% sodium hydroxide and 7,043 gallons of sodium persulfate at 450 grams per liter (g/L) concentration (20,064 pounds). A PMR was submitted to USEPA and NJDEP in October 2016 (Chevron 2016). The PMR recommended additional sampling until all geochemical parameters had returned to baseline conditions. A LTMR was submitted to USEPA and NJDEP on March 5, 2019, requesting transition to MNA for benzene in groundwater for AOC 46 (Chevron 2019). An approval of the AOC 46 LTMR was received on April 10, 2019 (USEPA 2019).

An ISS/ESS PDI was conducted in 2015 and 2017 to address data gaps and to evaluate lead and BaP impacts identified in AOC 46 soil during previous investigations. An ISS/ESS PDI summary and NFA request was submitted in December 2017 (Chevron 2017). USEPA and NJDEP provided comments on the NFA in a letter dated March 14, 2018 (NJDEP 2018). Chevron submitted responses to USEPA and NJDEP comments and a revised justification for NFI on June 13, 2018 (Chevron 2018). As per USEPA request, an Addendum to the AOC 46 PDI Summary and Justification for NFI in response to the USEPA and NJDEP comments was submitted on May 21, 2019 (Chevron 2019). The USEPA and NJDEP approved the AOC 46 NFA addendum in a letter dated February 4, 2020 (USEPA 2020).

An AOC 45/46 PDI was conducted in 2014, and a Treatability Study was performed in third and fourth quarters 2014. An ISCF Pilot Test IWP and DGW/PBR request was submitted in fourth quarter 2014. A phased investigation was proposed to further delineate the extent of arsenic-impacted groundwater. An IWP for the implementation of a CM to address arsenic impacts in AOC 45/46 groundwater was submitted to USEPA and NJDEP on September 4, 2019 (Chevron 2019). Chevron received approval of the AOC 45/46 IWP from USEPA, as well as comments on the IWP, in a letter dated October 29, 2019 (USEPA 2019). A response to USEPA comments on the IWP was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020). The construction of the PRB wall began in November 2019 and was completed in January 2020. Due to the presence of utilities and other obstructions encountered along the length of the adjusted PRB wall alignment, the PRB wall has seven gaps totaling 61.5 feet. With the field adjustment to the PRB wall alignment and the 61.5 feet of gaps, the total length of PRB wall installed in AOC 45/46 is 470.5 feet. A mixture of ZVI and certified clean sand was used as the reactive media for the construction of the PRB wall. Based on the revised PRB wall alignment and utilities and other obstructions encountered along the PRB wall alignment, a total of 470.5 feet of PRB wall was installed, and 246 tons (492,000 pounds) of ZVI was used to construct the PRB wall in AOC 45/46.

A notice of planned physical alteration to the Facility was submitted on April 23, 2018 (Chevron 2018). The alteration included installing an impermeable secondary containment liner, cemented catch basin, and drain line as part of the New York Harbor Expansion Project L606 Pipeline. USEPA

approved the alteration in a letter dated May 16, 2018 (USEPA 2018). The planned liner was installed within the containment area for newly constructed Tank 781 and existing Tank 780.

A PDI was conducted in AOCs 45 and 46 in 2019 to determine the nature and extent of arsenic-impacted surface soil. An IWP to address arsenic impacted surface soil was submitted to USEPA and NJDEP in January 2020 (Chevron 2020). The capping CM was implemented in AOCs 45 and 46 between February 20 and March 20, 2020.

All deed notices are discussed in the *Deed Notices* section.

LNAPL impacts associated with AOC 46 are discussed in the *LNAPL* section.

Submittals related to AOC 45 include:

- Chevron. 2015. In Situ Chemical Oxidation Implementation Work Plan. Area of Concern 46. February.
- Chevron. 2016. ISCO Permit-by-Rule Monitoring Report for AOC 46. October.
- Chevron. 2017. ISS-ESS PDI Summary and Justification for No Further Action, AOC 46. December.
- Chevron. 2018. Letter to USEPA, Notification of Planned Physical Alteration to the Facility, Secondary Containment Liner Installation and Drainage System Improvement – L606 New York Harbor Expansion Project, East Yard. April.
- Chevron. 2018. Letter to NJDEP. ISS/ESS PDI Summary and Justification for No Further Investigation, AOC 46. June.
- Chevron. 2019. In Situ Chemical Oxidation Long-Term Monitoring Report for Area of Concern 46. March.
- Chevron. 2019. Addendum to In situ Stabilization and Ex situ Stabilization Pre-Design Investigation Summary and Justification for No Further Investigation – Area of Concern 46. May.
- Chevron. 2019. In Situ Chemical Fixation Implementation Work Plan, Area of Concern 45/46. September.
- Chevron. 2020. Implementation Work Plan to Address Arsenic Impacted Surface Soil. January.
- Chevron. 2020. Response to USEPA AND NJDEP Comments. ISCF IWP for AOC 45/46. March.

AOC 47

AOC 47 is at the former No. 4 Crude Unit in the Main Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

The Arsenic Cap FDR was submitted in May 2013 and proposed NFA for arsenic in AOC 34 soil. NJDEP approved the FDR in a letter dated June 4, 2014.

All deed notices are discussed in the *Deed Notices* section.

AOC 48

AOC 48 is at the former Isomax Process Plant in the Main Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in November 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- MNA and filing a CEA for groundwater

The Arsenic Cap FDR was submitted in May 2013 and proposed NFA for arsenic in soil. NJDEP approved the FDR in a letter dated June 4, 2014.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

AOC 49

AOC 49 is at the former #3 Rheniformer in the Main Yard. The area was identified as an AOC based on the results of a PAOC site investigation conducted in December 2002. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

An NFA justification letter for arsenic in surfice soil was submitted to the USEPA and NJDEP on January 25, 2018 (Chevron 2018). USEPA approved the NFA request for AOC 49 on October 12, 2018 (USEPA 2018).

All deed notices are discussed in the *Deed Notices* section.

Submittals for AOC 49 include:

- Chevron. 2018. NFA Justification for Arsenic in Surficial Soil at AOC 49. January.

AOC 50

AOC 50 is at the Bulk Station. AOC 50 is a large area consisting of an unpaved area in the northern portion of AOC 50 and a paved area surrounding an active Bulk Station in the southern portion of AOC 50. Given the size of AOC 50 and the distribution of contaminants in soil, AOC 50 was divided into two separate areas – AOC 50 South and AOC 50 North.

AOC 50 South:

An ISS/ESS PDI was conducted in 2013 to address data gaps and to evaluate the lead, TEL, and benzene impacts identified in AOC 50 soil during previous investigations. The results of the PDI and

the proposed CMs for AOC 50 South were presented in the CM IWP for AOC 50 South (Chevron 2017). The IWP proposed soil excavation with disposal in the on-site CAMU and capping to address lead, surficial arsenic, benzene, and TEL-impacted soil. NJDEP provided comments on the AOC 50 South CM IWP on June 14, 2017 (NJDEP 2017), and Chevron submitted a response to the NJDEP comments on July 12, 2017 (Chevron 2017). NJDEP provided a second round of comments on July 28, 2017 (NJDEP 2017), and Chevron responded to these comments on August 31, 2017 (Chevron 2017). USEPA and NJDEP approved the AOC 50 South CM IWP on October 13, 2017 (USEPA 2017). The CMI in AOC 50 South was implemented from September 13 through 22, 2017. Since lead concentrations in soil at AOC 50 South were above the CMI action level, the soil was mixed with EnviroBlend® 80/20 to stabilize the lead prior to disposal in the on-site CAMU. Approximately 793 cubic yards of soil were excavated and disposed of in the CAMU. The existing asphalt, concrete, and other surfaces in AOC 50 South serve as a low-permeability cap (engineering control) to prevent direct contact exposure to the lead- and arsenic-impacted soil. The AOC 50 South CM CCR was submitted to the USEPA and NJDEP on February 13, 2020 (Chevron 2020). USEPA approved the CCR on September 28, 2020 (USEPA 2020).

AOC 50 North:

An ISCO PDI to define benzene impacts in AOC 50 North was conducted in 2017 and 2018. An additional ISS/ESS PDI to define the lead impacts in AOC 50 North was completed in 2017. A combined IWP recommending excavation to address lead and arsenic impacts in soil, and benzene impacts in soil and groundwater in the southern portion of AOC 50 North, was submitted on November 20, 2018 (Chevron 2018). The ESS, benzene, and arsenic excavation CMs were implemented in AOC 50 North from December 3, 2018, through February 5, 2019. Approximately 5,459 cubic yards of lead-impacted soil were stabilized and excavated (ESS), and 96 cubic yards of benzene-impacted soil and 88 cubic yards of arsenic-impacted surface soil were excavated for disposal in the Facility's on-site CAMU. Excavated areas were backfilled with certified clean fill material. USEPA and NJDEP provided comments on the AOC 50 North Corrective Measures IWP on April 5, 2019 (USEPA 2019). Chevron provided a response to the comments on July 2, 2019 (Chevron 2019). USEPA provided additional comments on July 26, 2019 (USEPA 2019) to be addressed under the CM IWP Addendum for AOC 50 North. The CM IWP Addendum was submitted to USEPA and NJDEP on October 8, 2019 (Chevron 2019). The IWP Addendum proposed installation of a biosparge system to address benzene-impacted soil and groundwater in the northernmost portion of AOC 50 North. USEPA and NJDEP approved the CM IWP Addendum for AOC 50 North in a letter dated December 1, 2020 (USEPA 2020). The biosparge system began operating in December 2020. The AOC 50 North CM CCR was submitted to the USEPA and NJDEP on March 18, 2020 (Chevron 2020).

Submittals related to AOC 50 include:

- Chevron. 2017. Implementation Work Plan, AOC 50 South. April.
- Chevron. 2017. Response to NJDEP Comments RAI#1, CM IWP AOC 50 South. July.
- Chevron. 2017. Response to NJDEP Comments RAI#2, CM IWP AOC 50 South. August.
- Chevron. 2018. Corrective Measures Implementation Work Plan. AOC 50 North. November.

- Chevron. 2019. Response to USEPA and NJDEP Comments. AOC 50N Corrective Measures Implementation Work Plan. July.
- Chevron. 2019. Corrective Measures Implementation Work Plan Addendum. Area of Concern 50 North. October.
- Chevron. 2020. Corrective Measures Construction Completion Report for AOC 50 North. March.

SWMU 1

SWMU 1 consists of the former North Field Basin, which was closed in accordance with a closure plan approved by the NJDEP. NFA for both soil and groundwater was proposed in the HSWA Permit Renewal.

SWMU 2

SWMU 2 consists of the Surge Pond. The Surge Pond was closed in-place by Chevron under NJDEP oversight through stabilizing the sludge and then capping the unit. Closure activities at the Surge Pond were completed in December 2004. The closed-in place Surge Pond area is currently subject to monitoring and post-closure care under NJDEP oversight. NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

SWMU 3

SWMU 3 consists of an approximately 500-foot by 110-foot rectangular earthen impoundment constructed in 1977 and shut down in 1988. The basin is located along the Arthur Kill bulkhead in the East Yard. It served as storage for stormwater runoff, process water, and water draw from aboveground storage tanks in the East Yard before transport to the ETP. The central portion of SWMU 3 overlies the former Oil Water Separator (SWMU 36) located along the bulkhead. This was a RCRA regulated unit, which was closed under NJDEP oversight. NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

SWMU 5

SWMU 5 consists of a 20-foot by 20-foot TEL Sludge Burial Area west of the Surge Pond in the North Field, which was identified as a SWMU based on the presence of the TEL burial. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if necessary
- ISS for lead in soil, installation of a cap, and filing a deed notice
- Continue LRMs for groundwater, until all the LNAPL is removed to the extent practicable
- MNA and filing a CEA for groundwater

Due to the overlapping boundaries of SWMU 5, SWMU 21, and SWMU 43, a PDI to evaluate all PCOCs concurrently was conducted in 2017 and 2018. A CM IWP and associated DGW/PBR request was submitted to USEPA and NJDEP on September 28, 2018 (Chevron 2018). The IWP proposed ISS, ISCO soil mixing, and application of bioremediation amendments to address lead-

and benzene-impacted soil and benzene-impacted groundwater. Comments were received from USEPA and NJDEP on February 8, 2019 (USEPA 2019) and Chevron provided a response to the USEPA and NJDEP comments, along with an IWP Addendum, on June 20, 2019 (Chevron 2019). USEPA approved the IWP on July 13, 2019 (USEPA 2019) and NJDEP issued the DGW/PBR permit on July 19, 2019 (NJDEP 2019). The ISS, ISCO soil mixing, and bioremediation CMs were implemented in SWMU 43 in September and October 2019. Approximately 3,980 cubic yards of lead-impacted soil were stabilized (ISS). ISCO soil mixing was completed in approximately 2,470 cubic yards of benzene-impacted soil, and bioremediation amendments were added to approximately 2,360 cubic yards of soil. The total quantities of chemical added complied with the PBR/DGW authorization and were as follows: 117,914 pounds of sodium persulfate, 79,344 pounds of potassium persulfate, 74,737 pounds of calcium hydroxide, 219,600 pounds of gypsum, 4,000 pounds of apatite, and 200 pounds of diammonium phosphate.

The SWMU 5/21/43 capping CM Final Design Report was submitted to USEPA and NJDEP on April 7, 2020 (Chevron 2020). The SWMU 43 cap construction began in April 2020 and was completed in August 2020. The construction of the SWMU 43 cap involved excavation for the installation of the perimeter stormwater drainage system, importation of certified clean fill material, grading, and installation of the various elements of the cap. Excavation was performed along the northern and eastern sides of the proposed cap area to confirm the location and elevation of the existing sheetpile wall. A drainage system was constructed around the perimeter of the SWMU 43 cap area to convey stormwater runoff from the capped area to tank basins located to the west and south of the capped area. Soil excavated from the perimeter of SWMU 43 for the construction of the perimeter drainage system was placed within the footprint of the cap area. The excavated material was used as general fill to raise the grade to achieve the required subgrade elevation. The drainage system outfalls located within adjacent tank basins were constructed with gabion mattresses to protect the PVC drain pipes and to prevent erosion of soil adjacent to the pipe outfalls. The SWMU 43 cap, from bottom to top, consists of a sandy soil cushion layer, geomembrane, geocomposite drainage media, sandy soil drainage layer, woven geotextile separator, and a gravel cover. The SWMU 43 Cap CCR was submitted to USEPA and NJDEP on December 11, 2020 (Chevron 2020).

An NFA request for arsenic in groundwater was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020).

LRMs are currently ongoing.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 5 include:

- Chevron. 2018. Corrective Measure Implementation Work Plan for SWMU 5/21/43. September.
- Chevron. 2019. Response to Comments. Corrective Measures Implementation Work Plan Addendum for SWMU 5/21/43. June.
- Chevron. 2020. Justification for NFA for Arsenic in SWMU 5 Groundwater. March.
- Chevron. 2020. Capping Corrective Measure Final Design Report – SWMU 43. April.

- Chevron. 2020. SWMU 43 Cap Construction Completion Report. December.

SWMU 6

SWMU 6 is the 20-foot by 20-foot TEL burial area in the western portion of Tank Basin 306, east of Tank 9209 in the North Field. The SWMU was identified based on the presence of a TEL burial. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if necessary
- ISS for lead in soil and filing a deed notice
- Excavation, ESS and disposal in the CAMU for TEL/TOL concentrations >2 mg/kg for soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Continue LRMs for groundwater; until all the LNAPL is removed to the extent practicable
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and to evaluate lead and TEL impacts identified in SWMU 6 soil during previous investigations. The results of the SWMU 6 PDI and the proposed CMs for SWMU 6 were presented in an ISS/ESS IWP for SWMU 6 (Chevron 2015). The ISS and ESS CMs were implemented in SWMU 6 in September and October 2015. Approximately 70 cubic yards of ISS soil were stabilized in SWMU 6, and approximately 150 cubic yards of ESS soil were stabilized, excavated, and disposed of in the on-site CAMU. The ESS excavation areas were backfilled with certified clean material. NJDEP provided comments on the SWMU 6 ISS/ESS IWP in an email dated September 21, 2015, and Chevron responded to the NJDEP comments on October 20, 2015 (Chevron 2015). NJDEP approved the SWMU 6 ISS/ESS IWP and the responses to NJDEP comments in a letter dated October 27, 2015 (NJDEP 2015). The SWMU 6 CCR requesting an NFA for lead and TEL impacts in SWMU 6 soil was submitted to the NJDEP and USEPA on September 6, 2017 (Chevron 2017). The CCR was approved on November 17, 2017 (USEPA 2017).

An ISCO PDI was conducted between 2016 and 2018 to identify data gaps and evaluate benzene impacts in soil and groundwater. An IWP for the ISCO and excavation CMs at AOC 15 and SWMUs 6, 16, and 40 was submitted to USEP and NJDEP in February 2020 (Chevron 2020). USEPA and NJDEP provided comments in a letter dated May 21, 2020 (USEPA 2020), and RTCs were submitted by Chevron on June 5, 2020 (Chevron 2020). Additional comments were provided by NJDEP in an email on July 30, 2020. Chevron provided an IWP Addendum and a response to the additional comments on August 5, 2020 (Chevron 2020). The discharge to groundwater authorization was received from NJDEP on August 12, 2020 (NJDEP 2020). The excavation CM (SWMUs 6, 16, and 40 only) was completed between March 2 and April 17, 2020, and the soil mixing event occurred between August 14 and September 1, 2020. Approximately 2,000 cubic yards of benzene-impacted soil were excavated and disposed of in the on-site CAMU. ISCO soil mixing covered an approximately 20,000-square-foot area. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 175,500 pounds

of calcium hydroxide, 309,662 pounds of sodium persulfate, and 136,648 pounds of potassium persulfate.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 6 include:

- Chevron. 2015. ISS/ESS Implementation Work Plan. SWMU 6. August.
- Chevron. 2015. Response to NJDEP Comments. ISS/ESS Implementation Work Plan – SWMU 6. October.
- Chevron. 2017. In Situ and Ex Situ Stabilization Construction Completion Report, SWMU 6. September.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. February.
- Chevron 2020. Response to USEPA Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. June.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan Addendum for Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. August.

SWMU 7

SWMU 7 consists of two 20-foot by 20-foot TEL sludge burials to the south and east of Tank Basin 305 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- ISS for lead in soil and filing a deed notice
- Excavation, ESS, and disposal in the CAMU for TOL concentration >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISS/ESS PDI was conducted in 2014 to address data gaps and to evaluate lead and TEL impacts identified in SWMU 7 soil during previous investigations. The results of the SWMU 7 PDI and the proposed CMs for SWMU 7 were presented in an ISS/ESS IWP for SWMU 7 (Chevron 2016). The ISS and ESS CMs were implemented in SWMU 7 in June 2016. Approximately 1,460 cubic yards of soil designated for ISS were stabilized in SWMU 7, and approximately 600 cubic yards of soil designated for ESS were stabilized, excavated, and disposed of in the on-site CAMU. The ESS excavation areas were backfilled with certified clean material. NJDEP provided comments on the SWMU 7 ISS/ESS IWP to Chevron in an email dated June 8, 2016 (NJDEP 2016), and Chevron responded to the NJDEP comments on October 13, 2016 (Chevron 2016). NJDEP approved the SWMU 7 ISS/ESS IWP and the responses to NJDEP comments in a letter dated December 5, 2016 (NJDEP 2016). A CCR for SWMU 7 was submitted to USEPA and NJDEP on April 3, 2018 (Chevron 2018), and USEPA and NJDEP approved the CCR on February 19, 2019 (USEPA 2019).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 7 include:

- Chevron. 2016. In situ and Ex situ Stabilization Implementation Work Plan. April.
- Chevron. 2016. Response to NJDEP Comments RAI #1. ESS Implementation Work Plan – SWMU 7. October.
- Chevron. 2018. ISS/ESS Construction Completion Report. SWMU 7. April.

SWMU 8

SWMU 8 consists of two 20-foot by 20-foot TEL sludge burials northwest of the former East Yard Basin (SWMU 3). The SWMU 8 LNAPL Area was identified in 2004 when LNAPL was detected in MW-132, which was installed in the center of the SWMU 8 burial area in October 2002. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if necessary
- Excavation, ESS and disposal in the CAMU for lead in soil and TEL/TOL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Continuation of LRMs for groundwater until all the LNAPL is removed to the extent practicable
- ISCO treatment for benzene concentrations >100 µg/L in groundwater; supplemented by enhanced bioremediation, if necessary
- In situ geochemical stabilization for arsenic groundwater concentration >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An ISCO PDI was completed at SWMU 8 during 2012. An IWP and an associated DGW/PBR was submitted to USEPA and NJDEP on October 2, 2012 (Chevron 2012). NJDEP provided comments on the IWP in an email dated November 27, 2012, and Chevron provided a response to the NJDEP comments on January 16, 2013 (Chevron 2013). NJDEP provided an additional round of comments in an email dated February 20, 2013, and Chevron responded to the comments with an IWP Addendum on February 22, 2013 (Chevron 2013). The discharge to groundwater authorization was received from NJDEP on February 25, 2013 (NJDEP 2013). The discharge of approved reagents was initiated on March 13 and completed on August 27, 2013. The targeted soil mass encompassed approximately 1,800 square feet, and the 7-foot vertical interval ranged from 3 to 10 feet bgs or 4 to 11 feet bgs. Injection Event #1 was initiated on March 13 and completed on April 05, 2013. A combined volume of 6,440 gallons of ISCO reagents were injected at SWMU 8, including 2,888 gallons of 25% sodium hydroxide, 2,320 gallons of sodium persulfate at 250 g/L concentration (4,836 pounds), and 1,232 gallons of sodium persulfate at 150 g/L concentration (1,540 pounds). Injection Event #2 was initiated on August 05 and completed on August 27, 2013. A combined volume of 6,224 gallons of ISCO reagents were injected, including 800 gallons of 25% sodium hydroxide, 3,760 gallons of sodium persulfate at 250 g/L concentration (7,836 pounds), and 1,664 gallons of sodium persulfate at 150 g/L concentration (2,081 pounds). A PMR was submitted to USEPA and NJDEP on April 16, 2014 (Chevron 2014). Based on the post-implementation groundwater data, an additional IWP for ISCO injections at SWMU 8 was submitted to USEPA and NJDEP in February 2018 (Chevron 2018). NJDEP provided three rounds of comments on the IWP via email and Chevron

provided responses via email on May 25, August 1, and August 28, 2018. The DGW/PBR approval was received from NJDEP on December 19, 2018 (NJDEP 2018). USEPA and NJDEP approved the February 2018 SWMU 8 ISCO IWP and all supporting correspondence in a letter dated February 19, 2019 (USEPA 2019). The injection of approved reagents was initiated on October 24, 2019, and was completed on November 18, 2019. A combined volume of 13,751 gallons of ISCO reagents were injected. The reagents included 2,499 gallons of sodium hydroxide and 11,252 gallons of sodium persulfate (approximately 19,804 pounds).

An ISS/ESS PDI was conducted in 2015 to address data gaps and to evaluate lead, TEL, and BaP impacts identified in SWMU 8 soil during previous investigations. The results of the SWMU 8 PDI and the proposed CMs for SWMU 8 were presented in an ESS IWP for SWMU 8 (Chevron 2015). NJDEP approved the SWMU 8 ESS IWP in a letter dated December 17, 2015 (NJDEP 2015). ESS was implemented in SWMU 8 from March through May 2016. A total of 2,875 cubic yards of soil were treated with EnviroBlend® 80/20 and excavated from SWMU 8 for disposal in the on-site CAMU. A CCR for SWMU 8 was submitted to USEPA AND NJDEP on April 12, 2018 (Chevron 2018). Chevron requested an NFA determination be issued for lead, TEL, and BaP impacts in SWMU 8 soil. A capping CM was proposed to address surface soil (0 to 2 feet bgs) with arsenic concentrations greater than 20 mg/kg identified in AOC 6C and lead concentrations greater than 800 mg/kg identified in the western portion of SWMU 8 (see *Engineering Controls* section for additional information). The cap was constructed in First Quarter 2020. The arsenic and lead cap CCR was submitted to USEPA and NJDEP in November 2020 (Chevron 2020).

An ISCF PDI was conducted in 2015 and 2016 to address and evaluate arsenic in SWMU 8 groundwater. A NFA request for arsenic in groundwater was submitted to USEPA and NJDEP on February 3, 2020 (Chevron 2020).

All deed notices are discussed in the *Deed Notices* section.

An NFA request for LNAPL in SWMU 8 was submitted with the Q2 2017 Quarterly Progress Report.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 8 include:

- Chevron. 2012. In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 8. October.
- Chevron. 2013. Response to NJDEP Comments on Permit-by-Rule Proposal for In Situ Chemical Oxidation (ISCO) Implementation Work Plan for Solid Waste Management Unit (SWMU) 8. January.
- Chevron. 2013. Response to NJDEP Comments (NJDEP's email dated February 20, 2013) and Addendum to Permit-by-Rule Proposal for In Situ Chemical Oxidation (ISCO) Implementation Work Plan for Solid Waste Management Unit (SWMU) 8. February.
- Chevron. 2014. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report. Solid Waste Management Unit 8. April.
- Chevron. 2015. Ex Situ Stabilization Implementation Work Plan. SWMU 8. October.

- Chevron. 2018. Implementation Work Plan. In Situ Chemical Oxidation Followed by Biostimulation. Solid Waste Management Unit 8. February.
- Chevron. 2018. Ex Situ Stabilization Construction Completion Report. SWMU 8. April.
- Chevron. 2020. Justification for NFA for Arsenic in SWMU 8 Groundwater. January.
- Chevron. 2020. Arsenic and Lead Cap Construction Completion Report. AOC 6C and SWMU 8. November.

SWMU 9

SWMU 9 is a suspected TEL burial area in the north-northwest corner of the Tank 753 basin in the East Yard. The analytical results for the 10 samples collected from SWMU 9 showed that no constituents exceeding the applicable NRDCSCC and NRDCSRS were present. Groundwater modeling of PCOCs within SWMU 9 demonstrated no exceedances, and no LNAPL is present. Based on these analyses, it was determined that SWMU 9 was not used for TEL burial. NFA was proposed in the HSWA Permit Renewal.

SWMU 10

SWMU 10 consists of two TEL sludge burials west of Tank Basin 771 in the East Yard. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TCLP lead levels >5 mg/L and TEL/TOL concentrations >2 mg/kg in soil
- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil, and filing a deed notice
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterward for arsenic concentrations >20 mg/kg in surface soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if necessary
- In situ geochemical stabilization for arsenic groundwater concentration >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An ISCO PDI was conducted in SWMU 10 in 2013 and 2014. An IWP and an associated DGW/PBR request was submitted to USEPA and NJDEP in July 2014 (Chevron 2014). NJDEP provided comments on the IWP in an email dated September 12, 2014, and Chevron responded to the NJDEP comments on September 17, 2014. The first ISCO injection event (Event #1) was initiated on March 18, 2015 and was completed on June 22, 2015. On July 29, 2015, the NJDEP approved a request to extend the PBR discharge authorization from September 14 to September 30, 2015, to facilitate another ISCO injection event in SWMU 10. The discharge of approved reagents as part of the second ISCO injection event (Event #2) was initiated on August 7, 2015, and was completed on September 29, 2015. The ISCO treatment for benzene exceeding the CMI action level targeted an approximately 1,600-square-foot area and an 8-foot vertical interval ranging from 3 to 11 feet bgs. Approximately 1,550 gallons of 25% sodium hydroxide and approximately 5,350 gallons of Klozur® mixture (at approximately 31-35% w/w) were injected into the subsurface at the SWMU 10 ISCO

treatment area during Event #1. Approximately 1,030 gallons of 25% sodium hydroxide and approximately 5,200 gallons of Klozur® mixture (at approximately 35% w/w) were injected into the subsurface at the SWMU 10 ISCO treatment area during Event #2. A PMR was submitted to USEPA and NJDEP on April 28, 2017 (Chevron 2017). The PMR was approved by NJDEP on May 30, 2017 (NJDEP 2017). The SWMU 10 LTMR was submitted to USEPA and NJDEP on April 21, 2020 (Chevron 2020), and recommended transitioning SWMU 10 to MNA in groundwater. The LTMR was approved by USEPA and NJDEP on October 21, 2020 (USEPA 2020).

An ISS/ESS PDI was conducted in 2015 to address data gaps and to evaluate lead, TEL, and BaP impacts identified in SWMU 10 soil during previous investigations. The results of the SWMU 10 PDI and the proposed CMs for SWMU 10 were presented in an ESS IWP for SWMU 10 (Chevron 2016). ESS was implemented in SWMU 10 from April 6 through April 20, 2016. Approximately 1,140 cubic yards of soil were removed from the SWMU 10 areas. The excavated soil intended for disposal was transported directly to the Facility's on-site CAMU. NJDEP provided comments on the SWMU 10 ESS IWP to Chevron in an email dated May 16, 2016, and Chevron responded to the NJDEP comments in a letter dated October 13, 2016 (Chevron 2016). NJDEP approved the SWMU 10 ESS IWP and the responses to NJDEP comments in a letter dated December 6, 2016 (NJDEP 2016). A CCR was submitted to USEPA and NJDEP on December 19, 2017 (Chevron 2017). The CCR recommended NFA for lead and TEL impacts in SWMU 10 soil. USEPA and NJDEP provided conditional approval of the SWMU 10 ESS CCR on November 14, 2018 (USEPA 2018), pending the submittal of acceptable responses to agency comments. Response to USEPA and NJDEP comments were submitted to on July 30, 2019 (Chevron 2019), and the approval was received from USEPA and NJDEP on August 30, 2019 (USEPA 2019).

Based on groundwater sampling results, an MNA request for arsenic in groundwater was submitted to USEPA and NJDEP on November 8, 2017 (Chevron 2017). USEPA provided comments on the NFA request on November 7, 2018 (USEPA 2018) and Chevron provided responses to USEPA and NJDEP in a letter dated June 20, 2019 (Chevron 2019). Chevron received approval of the NFA request on July 3, 2019 (USEPA 2019).

An NFA justification report for arsenic in surface soil was submitted to USEPA and NJDEP on March 3, 2020 (Chevron 2020).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 10 include:

- Chevron. 2014. In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 10. July.
- Chevron. 2014. Response to NJDEP Comments on Permit-by-Rule Proposal for In Situ Chemical Oxidation Implementation Work Plan for Solid Waste Management Unit 10. September.
- Chevron. 2016. Ex situ Stabilization Implementation Work Plan. SWMU 10. March.

- Chevron. 2016. Letter to NJDEP, Response to NJDEP Comments RAI #1, ESS IWP – SWMU 10. October.
- Chevron. 2017. In situ Chemical Oxidation Permit-by-Rule Monitoring Report. Solid Waste Management Unit 10. April.
- Chevron. 2017. Justification to Transition to Monitored Natural Attenuation for Arsenic in Groundwater at Solid Waste Management Unit 10. November.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report, SWMU 10. December.
- Chevron. 2019. Response to USEPA/NJDEP Comments on Justification for Transition to MNA for Arsenic in Groundwater at SWMU 10, dated November 8, 2017. June.
- Chevron. 2019. Response to Comments Letter. Response to USEPA AND NJDEP Comments. ESS Construction Completion Report for SWMU 10. July.
- Chevron. 2020. No Further Action Justification for Arsenic in Surface Soil in SWMU 10. March.
- Chevron. 2020. In situ Chemical Oxidation Long-Term Monitoring Report. Solid Waste Management Unit 10. April.
- Chevron. 2020. No Further Action Justification for Arsenic in Surface Soil: East Yard. June.

SWMU 11A

SWMU 11A consists of three TEL burial areas in the State Street Parking Lot (SSPL) along the Conrail right-of-way. The CMs approved in the HSWA Permit Renewal are:

- ISS for lead in soil and filing a deed notice
- Excavation, ESS and disposal in the CAMU for TEL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA for groundwater (granted on January 21, 2005)

An ISS/ESS PDI was conducted in 2015 to address data gaps and to evaluate lead and TEL impacts identified in SWMU 11A soil during previous investigations. The results of the SWMU 11A PDI and the proposed CMs for SWMU 11A were presented in the August 2015 ISS/ESS IWP for SWMU 11A (Chevron 2015). The ISS and ESS CMs for SWMU 11A were implemented on September 24, 2015. Approximately of 46 cubic yards of ISS soil and 254 cubic yards of ESS soil were stabilized with EnviroBlend® 80/20 in SWMU 11A. NJDEP provided comments on the SWMU 11A ISS/ESS IWP in an email on October 19, 2015, and Chevron responded to the NJDEP comments in a letter dated November 10, 2015 (Chevron 2015). NJDEP approved the SWMU 11A ISS/ESS IWP and the responses to NJDEP comments in a letter dated December 14, 2015 (NJDEP 2015). An ISS/ESS CCR for SWMU 11A was submitted on August 29, 2017 (Chevron 2017) and recommended NFA for lead and TEL impacts in SWMU 11A soil. The CCR was approved on December 13, 2017 (USEPA 2017).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SMWU 11A include:

- Chevron. 2015. ISS/ESS Implementation Work Plan. SWMU 11A. August.

- Chevron. 2015. Response to NJDEP Comments. ISS/ESS Implementation Work Plan – SWMU 11A. November.
- Chevron. 2017. In Situ and Ex Situ Stabilization Construction Completion Report, SWMU 11A. August.

SWMU 11B

SWMU 11B was determined not to have been used for TEL burial, given that there were no exceedances of the applicable NRDCSCC or NRDCSRS in analytical results, and lead was not detected in the groundwater in the area. The CMs approved in the HSWA Permit Renewal are:

- NFA proposed for soil
- Continuation of LRMs for groundwater, until all LNAPL is removed to the extent practicable
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if necessary
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2016 to evaluate lead impacts identified in SWMU 11B. The results of the SWMU 11B PDI were presented in a letter request for an NFA determination for lead in soil, dated December 5, 2016 (Chevron 2016). NJDEP approved the SWMU 11B NFA in a letter dated January 10, 2017 (NJDEP 2017). See the *Engineering Controls* section for additional information on engineering controls used for lead-impacted soil at SWMU 11B.

An ISCO PDI was conducted in 2015 and 2016. An ISCO IWP and associated DGW/PBR request was submitted to USEPA and NJDEP in September 2016 (Chevron 2016). NJDEP provided comments on the IWP in an email dated October 25, 2016, and Chevron responded to the NJDEP comments in a letter dated November 11, 2016 (Chevron 2016). The DGW/PBR permit was received from NJDEP on November 30, 2016 (NJDEP 2016). The ISCO soil mixing and excavation CMs were implemented from January 4 through February 2, 2017. The ISCO treatment for benzene exceeding the CMI action level targeted a soil layer 5 to 11 feet thick over an approximately 3,000-square-foot area. Treatment depths ranged from 1.5 to 14 feet bgs. Approximately 113 cubic yards of soil were excavated from SWMU 11B and disposed of in the CAMU. The total quantities of calcium hydroxide and sodium persulfate mixed in soil were 20,987.5 and 78,045 pounds, respectively. A PMR was submitted to NJDEP/USEPA on November 26, 2018 (Chevron 2018). USEPA and NJDEP provided comments and conditionally approved the PMR on April 10, 2019 (USEPA 2019). Chevron responded to the USEPA comments in a letter dated July 8, 2019 (Chevron 2019).

Based on groundwater sampling results, an NFA request for arsenic in groundwater was submitted to USEPA and NJDEP on August 18, 2020 (Chevron 2020).

LNAPL impacts associated with SWMU 11B are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 11B include:

- Chevron. 2016. In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 11B. September.
- Chevron. 2016. Response to NJDEP Comments on Permit-by-Rule Proposal for In Situ Chemical Oxidation (ISCO) Implementation Work Plan for Solid Waste Management Unit (SWMU) 11b. November.
- Chevron. 2016. Letter to NJDEP, Justification for NFA for SWMU 11b. December.
- Chevron. 2018. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report. Solid Waste Management Unit 11B. November.
- Chevron. 2019. Response to USEPA Comments on the In Situ Chemical Oxidation Permit-by-Rule Monitoring Report for SWMU 11B, dated November 26, 2018. July.
- Chevron. 2020. Justification for No Further Investigation for Arsenic in Solid Waste Management Unit 11B Groundwater. August.

SWMU 12

SWMU 12 consists of three TEL burial areas in the northwest side of the Tank 27 basin in Central Yard. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TEL concentrations >2 mg/kg in soil
- ISS for lead in soil and filing a deed notice
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISS/ESS PDI was conducted in 2013 to address data gaps and to define the lead and TEL impacts identified in SWMU 12 soil during previous investigations. The results of the SWMU 12 PDI were presented in a letter request for an NFA determination for lead and TEL in soil in SWMU 12, dated June 27, 2013 (Chevron 2013). NJDEP approved the request in a letter dated September 9, 2013 (NJDEP 2013).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 12 include:

- Chevron. 2013. Justification for No Further Action (NFA). Solid Waste Management Unit (SWMU) 12. June.

SWMU 13

SWMU 13 consists of a TEL burial area in the west side of the Tank 28 basin in Central Yard. Given that there were no exceedances of the applicable NRDCSCC and NRDCSRS in any of analytic results of soil samples, and lead was not detected in the groundwater in the area, it was determined that SWMU 13 was not used for disposal of TEL wastes. Per the HSWA Permit Renewal, NFA was proposed and granted for both soil and groundwater.

SWMU 14

SWMU 14 consists of two TEL burial areas in the southeast side of the Tank 23 basin in Central Yard. No COCs were detected above the applicable NRDCSCC and NRDCSRS in soil or the GWQS

in groundwater. Per the HSWA Permit Renewal, NFA was proposed and granted for both soil and groundwater.

SWMU 15

SWMU No. 15 consists of a TEL burial area in the south side of the Tank 14 basin in Central Yard. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS, and disposal in the CAMU for BaP concentrations >10 mg/kg in soil
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2013 to address data gaps and to define the BaP impacts identified in SWMU 15 soil during previous investigations. The results of the SWMU 15 PDI were presented in a letter request for an NFA determination for BaP in soil in SWMU 15, dated December 16, 2013 (Chevron 2013). NJDEP approved the request in a letter dated February 10, 2014 (NJDEP 2014).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 15 include:

- Chevron. 2013. Justification for No Further Action. Solid Waste Management Unit 15. December.

SWMU 16

SWMU 16 consists of a 20-foot by 20-foot TEL sludge burial in the eastern portion of Tank Basin 306 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contamination in soil, supplemented by enhanced bioremediation, if necessary
- Excavation, ESS and disposal in the CAMU for TOL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- Containment consisting of constructing a cap and filing a deed notice afterward for arsenic concentrations >20 mg/kg in surface soil
- ISCO treatment for benzene concentrations >100 µg/L in groundwater
- In situ geochemical stabilization for arsenic groundwater concentration >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

The Arsenic Cap FDR was submitted in May 2013. The FDR proposed NFA for arsenic in SWMU 16 soil. NJDEP approved the FDR in a letter dated June 4, 2014.

An ISS/ESS PDI was conducted in 2014 to address data gaps and to evaluate TEL impacts identified in SWMU 16 soil during previous investigations. The results of the SWMU 16 PDI and the proposed CMs for SWMU 16 were presented in an ESS IWP for SWMU 16 (Chevron 2016). ESS was implemented in SWMU 16 from January 28 through February 26, 2016. Approximately 550 cubic

yards of soil were excavated from SWMU 16 and disposed of in the on-site CAMU. NJDEP approved the SWMU 16 ESS IWP in a letter dated March 9, 2016 (NJDEP 2016). The SWMU 16 CCR was submitted to the NJDEP and USEPA on September 6, 2017 (Chevron 2017). The CCR was approved on November 17, 2017 (USEPA 2017).

In conjunction with SWMU 29 and SWMU 40, justification for NFA for arsenic in SWMU 16 groundwater was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020).

An ISCO PDI was conducted between 2016 and 2018 to identify data gaps and evaluate benzene impacts in soil and groundwater. An IWP for the ISCO and excavation CMs at AOC 15 and SWMUs 6, 16, and 40 was submitted to USEP and NJDEP in February 2020 (Chevron 2020). USEPA and NJDEP provided comments in a letter dated May 21, 2020 (USEPA 2020) and a response to comments was submitted by Chevron on June 5, 2020 (Chevron 2020). Additional comments were provided by NJDEP in an email on July 30, 2020. Chevron provided an IWP Addendum and a response to the additional comments on August 5, 2020 (Chevron 2020). The discharge to groundwater authorization was received from NJDEP on August 12, 2020 (NJDEP 2020). The excavation CM (SWMUs 6, 16, and 40 only) was completed between March 2 and April 17, 2020 and the soil mixing event occurred between August 14 and September 1, 2020. Approximately 2,000 cubic yards of benzene-impacted soil were excavated and disposed of in the on-site CAMU. ISCO soil mixing covered an approximately 20,000-square-foot area. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 175,500 pounds of calcium hydroxide, 309,662 pounds of sodium persulfate, and 136,648 pounds of potassium persulfate.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 16 include:

- Chevron. 2016. Ex situ Stabilization Implementation Work Plan. SWMU 16. January.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report, SWMU 16. September.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. February.
- Chevron. 2020. Justification for NFA for Arsenic in SWMUs 16, 29 and 40. March.
- Chevron 2020. Response to USEPA Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. June.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan Addendum for Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. August.

SWMU 17

SWMU 17 consists of a 40-foot by 40-foot TEL sludge burial in the eastern portion of Tank Basin 301 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contamination in soil, supplemented by enhanced bioremediation, if necessary
- Excavation, ESS and disposal in the CAMU for lead in soil and TEL/TOL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- ISCO treatment for benzene concentrations >100 µg/L in groundwater
- MNA and filing a CEA for groundwater

An ISCO PDI was conducted between 2016 and 2018 to define benzene impacts in soil and groundwater. An ISS/ESS PDI was conducted in 2018 to address data gaps and to define the lead and TEL impacts identified in SWMU 17 soil during previous investigations. The results of the PDIs were incorporated into a combined CM IWP to address lead and benzene impacts in SWMU 17 (Chevron 2019). The ESS and benzene excavation CMs were implemented in SWMU 17 in March 2019. Approximately 843 cubic yards of lead- and TEL-impacted soil were stabilized and excavated, and 530 cubic yards of benzene-impacted soil were excavated. ESS and excavated benzene-impacted soils were disposed of in the Facility's on-site CAMU. Excavated areas were backfilled with certified clean fill material. The CM IWP was approved by USEPA and NJDEP on October 22, 2019

(USEPA 2019). The CCR submitted to USEPA and NJDEP on April 30, 2020 (Chevron 2020) requested an NFA determination for lead, TEL, and benzene in SWMU 17 soil. The CCR was approved by USEPA and NJDEP on September 28, 2020 (USEPA 2020).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 17 include:

- Chevron. 2019. Corrective Measures Implementation Work Plan for SWMU 17. February.
- Chevron. 2020. Corrective Measures Construction Completion Report for SWMU 17. April.

SWMU 18

SWMU 18 consists of a 20-foot by 20-foot TEL sludge burial in the western portion of Tank Basin 301 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contamination in soil, supplemented by enhanced bioremediation, if necessary
- ISS for lead in soil and filing a deed notice
- Excavation, ESS and disposal in the CAMU for TOL concentrations >2 mg/kg in soil
- ISCO treatment, supplemented by enhanced bioremediation, if necessary, for benzene concentrations >100 µg/L in groundwater
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and to evaluate the lead and TOL impacts identified in SWMU 18 soil during previous investigations. Given the proximity of AOC 23,

AOC 41, and SWMU 18 and the apparent continuity of impacted soil from one area to the next, these three areas were combined and evaluated as one large area. The results of the SWMU 18 PDI and the proposed CM for SWMU 18 were presented in an ISS/ESS IWP for the combined AOC 23, AOC 41, and SWMU 18 Area (Chevron 2017). NJDEP provided comments on the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP on May 10, 2017 (NJDEP 2017). Chevron submitted responses to NJDEP in a letter dated September 21, 2017 (Chevron 2017), and USEPA and NJDEP approved the AOC 23, AOC 41, and SWMU 18 ISS/ESS IWP and the responses to NJDEP comments in a letter dated January 11, 2018 (USEPA 2018). ESS was implemented in PAOC 6 from February 6 through April 18, 2017, as proposed in the approved PAOC 6 ESS IWP. ISS and ESS were implemented in AOC 23/41 and SWMU 18 from March 1, 2017, through June 8, 2018, as proposed in the approved AOC 23/41 and SWMU 18 ISS/ESS IWP. Approximately 5,455 cubic yards of soil from the AOC 23/41 and SWMU 18 ESS areas and approximately 855 cubic yards of soil from PAOC 6 ESS areas were stabilized and removed. The stabilized soil was excavated and transported directly to the Facility's on-site CAMU for disposal. Approximately 200 cubic yards of soil in the AOC 23/41 and SWMU 18 ISS areas were stabilized. The AOC 23, AOC 41, SWMU 18, and PAOC 6 CCR was submitted to USEPA and NJDEP on February 20, 2020 (Chevron 2020) and was approved by the USEPA and NJDEP on April 6, 2020 (USEPA 2020).

The benzene-impacted soil was addressed as part of the ISS/ESS IWP. Based on post-implementation groundwater results, a combined CCR/IWP and associated DGW/PBR was submitted to NJDEP and USEPA on April 22, 2020 to address the remaining benzene-impacted groundwater (Chevron 2020). Two rounds of NJDEP comments were received from NJDEP via email and response to comments, including an IWP Addendum, were submitted to NJDEP on August 12 and 18, 2020 (Chevron 2020). A DGW/PBR permit was received on September 17, 2020 (NJDEP 2020). The ISCO treatment for benzene exceeding the CMI action level targeted a soil layer ranging from 4 to 7 feet thick over an approximately 11,000-square-foot area. Soil mixing commenced on September 21, 2020, and was completed on September 28, 2020. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 102,375 pounds of calcium hydroxide, 204,972 pounds of sodium persulfate, and 90,364 pounds of potassium persulfate.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 18 include:

- Chevron. 2017. ISS and ESS Implementation Work Plan for AOC 23, AOC 41, and SWMU 18. February.
- Chevron. 2017. Response to NJDEP Comments Response Action Item #1 ISS/ESS Implementation Work Plan – AOC 23, AOC 41, SWMU 18. September.
- Chevron. 2020. ISS and ESS Construction Completion Report for AOC 23, AOC 41, SWMU 18, and PAOC 6. February.
- Chevron. 2020. Construction Completion Report/Implementation Work Plan Addendum for Area of Concern 23, 41 and Solid Waste Management Unit 18. August.

SWMU 19

SWMU 19 consists of a 20-foot by 20-foot TEL sludge burial west of Tank 326 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contamination in soil, supplemented by enhanced bioremediation, if necessary
- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg and TEL concentrations >2 mg/kg in soil
- Containment consisting of constructing a cap and filing a deed notice afterward for arsenic concentrations >20 mg/kg in surface soil
- MNA and filing a CEA for groundwater

An ISCO PDI was conducted at SWMU 19 between 2012 and 2014. A letter requesting NFA for benzene impacts in soil and transition to MNA for benzene impacts in groundwater at SWMU 19 was submitted to USEPA and NJDEP on October 17, 2016 (Chevron 2016). NJDEP approved the request in December 2016 (NJDEP 2016).

An ISS/ESS PDI was conducted in 2016 to address data gaps and to define the TEL and BaP impacts identified in SWMU 19 soil during previous investigations. The results of the SWMU 19 PDI and the proposed CM for SWMU 19 were presented in the SWMU 19 ESS IWP (Chevron 2016). The ESS CM was implemented in SWMU 19 in November 2016. Approximately 501 cubic yards of soil designated for ESS were excavated from SWMU 19 and disposed of in the CAMU. NJDEP approved the SWMU 19 ESS IWP in a letter dated December 16, 2016 (NJDEP 2016). The SWMU 19 ESS CCR was submitted to USEPA and NJDEP on December 12, 2019 (Chevron 2019) and requested an NFA determination for BaP and TEL in SWMU 19 soil. The remaining lead-impacted soil was addressed as part of PAOC 6. The CCR was approved by USEPA and NJDEP in a letter dated March 4, 2020 (USEPA 2020).

Arsenic-impacted soil associated with SWMU 19 is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 19 include:

- Chevron. 2016. Ex situ Stabilization Implementation Work Plan, SWMU 19. October.
- Chevron. 2016. Justification for Transition to Monitored Natural Attenuation (MNA)/No Further Action (NFA) for Benzene Impacts at Solid Waste Management Unit (SWMU) 19. December.
- Chevron. 2019. ESS Construction Completion Report for SWMU 19. December.

SWMU 20

SWMU 20 consists of a TEL burial area east of Tank 302 in the North Field. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TCLP lead levels >5 mg/L and TOL concentrations >2 mg/kg in soil
- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and filing a deed notice
- Containment consisting of constructing a cap and filing a deed notice afterward for arsenic concentrations >20 mg/kg in surface soils
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if necessary
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and evaluate the lead and TOL impacts identified in SWMU 20 soil during previous investigations. The results of the SWMU 20 PDI and the proposed CMs for SWMU 20 were presented in an ISS/ESS IWP dated May 25, 2016 (Chevron 2016). NJDEP provided comments on the SWMU 20 ISS/ESS IWP to Chevron in an email dated July 5, 2016. Chevron submitted responses to the NJDEP comments in a letter dated October 13, 2016 (Chevron 2016). NJDEP approved the SWMU 20 ISS/ESS IWP and the responses to NJDEP comments in a letter dated December 5, 2016 (NJDEP 2016). The ISS and ESS CMs were implemented in SWMU 20 from May 9 through August 5, 2016. Ninety-one cubic yards of soil were stabilized in place (ISS), and 4,609 cubic yards of soil were stabilized and excavated (ESS) for disposal in the Facility's CAMU. The ISS/ESS CCR was submitted to USEPA and NJDEP on November 15, 2018 (Chevron 2018) and requested an NFA determination for lead and TEL impacts in SWMU 20 soil. USEPA and NJDEP provided comments on the CCR in a letter dated April 17, 2019 (USEPA 2019). Chevron submitted a response to comments on July 2, 2019 (Chevron 2019) and the CCR was approved by USEPA and NJDEP on July 26, 2019 (USEPA 2019).

Between 2014 and 2016 a combined ISCO PDI was conducted for the shallow groundwater benzene impacts at AOC 9A and SWMU 20. Results from the PDI were incorporated into an ISCO IWP for AOC 9A. The AOC 9A IWP proposed excavation and disposal in the CAMU to address benzene-impacted groundwater (Chevron 2017).

Arsenic-impacted soil associated with SWMU 20 is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 20 include:

- Chevron. 2016. In Situ and Ex Situ Stabilization Implementation Work Plan. SWMU 20. May.
- Chevron. 2016. Response to NJDEP Comments RAI #1. ISS/ESS Implementation Work Plan – SWMU 20. October.
- Chevron. November 15, 2018. In Situ Stabilization and Ex Situ Stabilization Construction Completion Report for SWMU 20. November.
- Chevron. 2019. Response to USEPA/NJDEP Comments. SWMU 20 ISS/ESS Construction Completion Report. July.

SWMU 21

SWMU 21 consists of a 20-foot by 20-foot TEL sludge burial at the Mudflats in the North Field. CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil supplemented by enhanced bioremediation, if necessary
- ISS for lead in soil, installing a non-RCRA cap, and filing a deed notice
- MNA and filing a CEA for groundwater

Due to the overlapping boundaries of SWMU 5, SWMU 21, and SWMU 43 a PDI to evaluate all PCOCs concurrently was conducted in 2017 and 2018. A CM IWP and associated DGW/PBR request was submitted to USEPA and NJDEP on September 28, 2018 (Chevron 2018). The IWP proposed ISS, ISCO soil mixing, and application of bioremediation amendments to address lead- and benzene-impacted soil and benzene-impacted groundwater. Comments were received from USEPA and NJDEP on February 8, 2019 (USEPA 2019), and Chevron provided a response to the USEPA and NJDEP comments, along with an IWP Addendum, on June 20, 2019 (Chevron 2019). USEPA approved the IWP on July 13, 2019 (USEPA 2019) and NJDEP issued the DGW/PBR permit on July 19, 2019 (NJDEP 2019). The ISS, ISCO soil mixing, and bioremediation CMs were implemented in SWMU 43 in September and October 2019. Approximately 3,980 cubic yards of lead-impacted soil were stabilized (ISS). ISCO soil mixing was completed in approximately 2,470 cubic yards of benzene-impacted soil, and bioremediation amendments were added to approximately 2,360 cubic yards of soil. The total quantities of chemical added complied with the PBR/DGW authorization and were as follows: 117,914 pounds of sodium persulfate, 79,344 pounds of potassium persulfate, 74,737 pounds of calcium hydroxide, 219,600 pounds of gypsum, 4,000 pounds of apatite, and 200 pounds of diammonium phosphate.

The SWMU 5/21/43 capping CM Final Design Report was submitted to USEPA and NJDEP on April 7, 2020 (Chevron 2020). The SWMU 43 cap construction began in April 2020 and was completed in August 2020. The construction of the SWMU 43 cap involved excavation for the installation of the perimeter stormwater drainage system, importation of certified clean fill material, grading, and installation of the various elements of the cap. Excavation was performed along the northern and eastern sides of the proposed cap area to confirm the location and elevation of the existing sheetpile wall. A drainage system was constructed around the perimeter of the SWMU 43 cap area to convey stormwater runoff from the capped area to tank basins located to the west and south of the capped area. Soil excavated from the perimeter of SWMU 43 for the construction of the perimeter drainage system was placed within the footprint of the cap area. The excavated material was used as general fill to raise the grade to achieve the required subgrade elevation. The drainage system outfalls located within adjacent tank basins were constructed with gabion mattresses to protect the PVC drain pipes and to prevent erosion of soil adjacent to the pipe outfalls. The SWMU 43 cap, from bottom to top, consists of a sandy soil cushion layer, geomembrane, geocomposite drainage media, sandy soil drainage layer, woven geotextile separator, and a gravel cover. The SWMU 43 Cap CCR was submitted to USEPA and NJDEP on December 11, 2020 (Chevron 2020).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 21 include:

- Chevron. 2018. Corrective Measure Implementation Work Plan for SWMU 5/21/43. September.
- Chevron. 2019. Response to Comments. Corrective Measures Implementation Work Plan Addendum for SWMU 5/21/43. June.
- Chevron. 2020. Justification for NFA for Arsenic in SWMU 5 Groundwater. March.
- Chevron. 2020. Capping Corrective Measure Final Design Report – SWMU 43. April.
- Chevron. 2020. SWMU 43 Cap Construction Completion Report. December.

SWMU 22

SWMU 22 consists of a 20-foot by 20-foot TEL sludge burial in the eastern portion of what was Tank Basin 329 in the North Field. CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TOL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg in soil
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2015 to address data gaps and to define the TEL impacts identified in SWMU 22 soil during previous investigations. The results of the SWMU 22 PDI were presented in a letter request for an NFA determination for TEL in soil in SWMU 22 dated August 18, 2016 (Chevron 2016). NJDEP approved the NFA request in a letter dated October 12, 2016 (NJDEP 2016).

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 22 include:

- Chevron. 2016. Justification for No Further Action (NFA). Solid Waste Management Unit (SWMU) 22. August.

SWMU 24

SWMU 24 consists of two TEL weathering areas north of Tank 306 and east of Tank 9209, at the south end of the ETP. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil supplemented by enhanced bioremediation, if necessary
- Excavation, ESS and disposal in the CAMU for TEL concentrations >2 mg/kg in soil
- Containment consisting of constructing a cap and filing a deed notice afterward for arsenic concentrations >20 mg/kg in surface soils
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg in soil
- MNA and filing a CEA for groundwater

Due to their proximity to one another, a combined ISCO PDI was conducted in SWMU 24 and SWMU 41 between 2017 and 2018. An ISCO IWP for SWMU 24/41 and associated DGW/PBR request to treat benzene-impacted soil and groundwater was submitted to USEPA and NJDEP on February 11, 2019 (Chevron 2019). NJDEP provided comments on the SWMU 24/41 IWP via email on May 20, 2019, and Chevron provided a response to comments on May 28, 2019 (Chevron 2019). Chevron received NJDEP approval of the IWP and the DGW/PBR permit on May 29, 2019 (NJDEP 2019). The ISCO soil mixing CM was implemented from June 12 through September 16, 2019. Approximately 696 cubic yards of soil were treated using ISCO soil mixing. The treatment depth ranged from approximately 5.0 to 11.5 feet bgs. The total quantities of ISCO chemicals included: 27,625 pounds of calcium hydroxide, 52,896 pounds of sodium persulfate, and 23,142 pounds of potassium persulfate.

An ISS/ESS PDI was conducted in 2014 to address data gaps and define the TEL impacts identified in SWMU 24 soil during previous investigations. The results of the SWMU 24 PDI were presented in a letter request for an NFA determination for TEL in soil in SWMU 24 (Chevron 2017). The NFA request was approved by NJDEP on July 24, 2017 (NJDEP 2017).

The Arsenic Cap FDR was submitted in May 2013. The FDR proposed NFA for arsenic in SWMU 24 soil. NJDEP approved the FDR in a letter dated June 4, 2014.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 24 include:

- Chevron. 2017. Justification for No Further Action for TEL in Soil. Solid Waste Management Unit 24. June.
- Chevron. 2019. In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 24/41. February.
- Chevron. 2019. Response to NJDEP Comments on the In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 24/41. May.

SWMU 25

SWMU 25 consists of a TEL weathering area north of the East Yard Basin in the East Yard. There were no exceedances of applicable NRDCSCC and NRDCSRS in any analytical results for soil samples or of the GWQS in the groundwater samples. NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

SWMU 26

SWMU 26 consists of the TEL Weathering Area south of the East Yard Basin. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in CAMU for TOL concentrations >2 mg/kg in soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and to define the TEL impacts identified in SWMU 26 soil during previous investigations. The results of the SWMU 26 PDI were presented in a letter request for an NFA determination for TEL in soil, dated August 18, 2016 (Chevron 2016). NJDEP approved the NFA request in a letter dated October 20, 2016 (NJDEP 2016).

An IWP to address arsenic-impacted surface soil in AOCs 14 and 26 and SWMU 26 was submitted to USEPA and NJDEP on October 17, 2019 (Chevron 2019), and approval was received on November 13, 2019 (USEPA 2019). The proposed cap consisted of areas containing existing infrastructure and buildings and areas where a cap would be constructed. The proposed cap was constructed using a visible demarcation consisting of non-woven geotextile fabric overlain by a minimum 1-foot-thick physical barrier of certified clean DGA to address arsenic-impacted surface soil. The CM was completed in March 2020.

An ISCF PDI was conducted in 2019 to evaluate the nature and extent of arsenic impacts in groundwater. The ISCF IWP for AOC 14 and SWMU 26 was submitted to USEPA and NJDEP on January 29, 2020 (Chevron 2020). USEPA and NJDEP provided comments via email on March 23, 2020. Responses to the USEPA and NJDEP comments were submitted on April 10, 2020 (Chevron 2020). Approval for the IWP and response to comments and the discharge to groundwater authorization were received on April 16, 2020 (USEPA and NJDEP 2020). The IWP proposed a PRB wall to remediate arsenic impacts in groundwater and to prevent the potential migration of arsenic-impacted groundwater beyond the limits of AOC 14 and SWMU 26. The construction of the AOC 14/SWMU 26 PRB wall began on April 20, 2020, and was completed on May 1, 2020. With the field adjustment to the PRB wall alignment and the 12-foot gap, the total length of PRB wall installed in AOC 14/SWMU 26 was 255 feet. A mixture of ZVI and certified clean sand was used as the reactive media for the construction of the PRB wall. A total of 137 tons (274,000 pounds) of ZVI was used to construct the PRB wall in AOC 14/SWMU 26.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 26 include:

- Chevron. 2017. Justification for No Further Action for Lead and BaP in Soil, Area of Concern 14. May.
- Chevron. 2017. Implementation Work Plan, Area of Concern 14 and Area of Concern 26. October.

- Chevron. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil. AOC 14/26 and SWMU 26. October.
- Chevron. 2020. ISCF IWP AOC 14/SWMU 26. January.
- Chevron. 2020. Response to USEPA AND NJDEP Comments, ISCF IWP for AOC 14/SWMU 26. April.
- Chevron. 2016. Justification for No Further Action. Solid Waste Management Unit 26. August.

SWMU 27

SWMU 27 consists of a TEL burial area north of Tank 312, west of the North Field Basin. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg and TEL concentrations >2 mg/kg in soil
- ISS for lead in soil and filing a deed notice afterwards
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for soils with BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA for groundwater

An ISS/ESS PDI was conducted in 2016 to address data gaps and evaluate the lead, BaP, and TEL impacts identified in SWMU 27 soil during previous investigations. Based on the results of the previous investigations and the 2016 PDI, the SWMU 27 and 29 impacts were found to overlap and were addressed as one area referred to as SWMUs 27/29. The results of the SWMU 27 PDI and the proposed CM for SWMU 27 were presented in an ISS/ESS IWP for the combined SWMUs 27/29 Area (Chevron 2016). ISS and ESS were implemented in SWMUs 27/29 from September 14 through October 14, 2016, as proposed in the approved SWMUs 27/29 ISS/ESS IWP. Approximately 1,705 cubic yards of soil were removed from the SWMUs 27/29 ESS areas, and approximately 1,690 cubic yards of soil were stabilized in situ in the SWMUs 27/29 ISS areas. The excavated soil intended for disposal was transported directly to the Facility's on-site CAMU. NJDEP approved the SWMU 27/29 ISS/ESS IWP and provided comments in a letter dated November 2, 2016 (NJDEP 2016). Responses to NJDEP comments were presented in a CCR, which was submitted to USEPA and NJDEP on February 5, 2019 (Chevron 2019). USEPA and NJDEP provided comments on the SWMUs 27/29 ISS/ESS CCR on April 5, 2019 (USEPA 2019). Chevron submitted a revision to the SWMUs 27/29 CCR on August 8, 2019 (Chevron 2019). In the CCR, Chevron requested an NFA determination for lead, BaP, and TEL in SWMUs 27/29 soil. The SWMUs 27/29 CCR was approved by USEPA and NJDEP in a letter dated February 6, 2020 (USEPA 2020).

Arsenic-impacted soil associated with SWMU 27 is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 27 include:

- Chevron. 2016. In Situ and Ex Situ Stabilization Implementation Work Plan. SWMUs 27/29. August.
- Chevron. 2019. ISS and ESS Construction Completion Report for SWMUs 27/29. February.
- Chevron. 2019. Response to USEPA AND NJDEP Comments. ISS/ESS CCR for SWMU 27/29. August.

SWMU 28

SWMU 28 consists of the Reactor Burial site. In the early 1960s, an explosion and fire in the area produced phthalic anhydride. After the fire, a reactor tank used for production was determined to be useless and was buried. The burial area is near the Short-Term Storage Area (SWMU 30). The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg in soil
- NFA is proposed for groundwater

All deed notices are discussed in the *Deed Notices* section.

SWMU 29

SWMU 29 is the location of the former spent catalyst transfer area. The catalyst material was staged, loaded, and transferred in this area. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TOL concentrations >2 mg/kg in soil
- ISS for lead in soil and filing a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2016 to address data gaps and evaluate the lead, BaP, and TEL impacts identified in SWMU 27 soil during previous investigations. Based on the results of the previous investigations and the 2016 PDI, the SWMU 27 and 29 impacts were found to overlap and were addressed as one area referred to as SWMUs 27/29. The results of the SWMU 27 PDI and the proposed CM for SWMU 27 were presented in an ISS/ESS IWP for the combined SWMUs 27/29 Area (Chevron 2016). ISS and ESS were implemented in SWMUs 27/29 from September 14 through October 14, 2016, as proposed in the approved SWMUs 27/29 ISS/ESS IWP. Approximately 1,705 cubic yards of soil were removed from the SWMUs 27/29 ESS areas, and approximately 1,690 cubic yards of soil were stabilized in situ in the SWMUs 27/29 ISS areas. The excavated soil intended for disposal was transported directly to the Facility's on-site CAMU. NJDEP approved the SWMU 27/29 ISS/ESS IWP and provided comments in a letter dated November 2, 2016 (NJDEP 2016). Responses to NJDEP comments were presented in a CCR, which was submitted to USEPA and NJDEP on February 5, 2019 (Chevron 2019). USEPA and NJDEP provided comments on the SWMUs 27/29 ISS/ESS CCR on April 5, 2019 (USEPA 2019). Chevron submitted a revision to the SWMUs 27/29 CCR on August 8, 2019 (Chevron 2019). In the CCR, Chevron requested an NFA

determination for lead, BaP, and TEL in SWMUs 27/29 soil. The SWMUs 27/29 CCR was approved by USEPA and NJDEP in a letter dated February 6, 2020 (USEPA 2020).

In conjunction with SWMU 16 and SWMU 40, justification for NFA for arsenic in SWMU 29 groundwater was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020).

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 29 include:

- Chevron. 2016. In Situ and Ex Situ Stabilization Implementation Work Plan. SWMUs 27/29. August.
- Chevron. 2019. ISS and ESS Construction Completion Report for SWMUs 27/29. February.
- Chevron. 2019. Response to USEPA AND NJDEP Comments. ISS/ESS CCR for SWMU 27/29. August.
- Chevron. 2020. Justification for NFA for Arsenic in SWMUs 16, 29 and 40. March.

SWMU 30

SWMU 30 consists of the area along the western edge of the North Field and is used for the temporary (less than 90 days) storage of hazardous and potentially hazardous waste. It was identified as a SWMU based on potential releases that might have included small volume leaks and spills from the 55-gallon drums and dumpsters stored in this area. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA is proposed for groundwater

An ISS/ESS PDI was conducted in 2015 to address data gaps and evaluate the BaP impacts identified in SWMU 38 soil during previous investigations. Due to a discrepancy in the boring locations presented in the RFI and CMS reports, this PDI also involved the collection of soil samples from SWMU 30 to define BaP impacts in soil. The results of the SWMU 38 PDI and the proposed CM for SWMU 38 were presented in the September 2015 ESS IWP for the combined SWMU 30/38 Area (Chevron 2015). The ESS CM was implemented in SWMU 30 on October 27, 2015. Approximately 130 CY of BaP-impacted soil were removed from SWMU 30 for disposal in the on-site CAMU. NJDEP approved the ESS IWP in a letter dated November 4, 2015 (NJDEP 2015). The SWMU 30/38 CCR was submitted to USEPA and NJDEP in June 2017 (Chevron 2017). Based on the 2015 PDI sampling results and the successful completion of the ESS CM in SWMU 30, Chevron recommended NFA for BaP impacts in SWMU 30 and SWMU 38 soil. The CCR was approved by NJDEP on July 24, 2017 (NJDEP 2017).

All deed notices are discussed in the *Deed Notices* section.

In summary, submittals related to SWMU 30 include:

- Chevron. 2015. Ex Situ Stabilization Implementation Work Plan. SWMU 30/38. September.

- Chevron. 2017. Ex Situ Stabilization Construction Completion Report. SWMU 30/38. June.

SWMU 31

SWMU 31 consists of the ETP. The ETP commenced operation in 1977 and provided treatment to process waste or wastewater generated from the process areas and to recover recyclable material before treated wastewater was discharged to Woodbridge Creek. Currently, the ETP primarily manages stormwater. The treatment units include an induced air floatation unit, an equalization tank, a rotating biological contactors system, clarifier tanks, and a post-aeration tank. The CMs approved in the HSWA Permit Renewal are:

- ISS for lead in soil and file a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA is proposed for groundwater

Given the overlap of SWMU 31 and SWMU 41, these units were addressed as one area referred to as SWMUs 31/41. An ISS/ESS PDI was conducted in 2016 to address data gaps and evaluate the lead and TEL impacts identified in SWMUs 31/41 soil during previous investigations. The results of the SWMUs 31/41 PDI were presented in a letter request for an NFA determination for lead and TEL in soil, dated September 7, 2016 (Chevron 2016). NJDEP approved the request in a letter dated November 18, 2016 (NJDEP 2016). See the *Engineering Controls* section for additional information on engineering controls used for lead-impacted soil at SWMUs 31/41.

LNAPL impacts in this area are discussed in the *LNAPL* section.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 31 include:

- Chevron. 2016. Justification for No Further Action for Lead and TEL in Soil, Solid Waste Management Units 31 and 41. September.

SWMU 32

SWMU 32 consists of the former polychlorinated biphenyl (PCB) Waste Storage Building. The unit was in the warehouse in the East Yard. Limited amounts of PCBs were generated when transformers were cleaned. None of the 27 wipe samples collected and analyzed for PCBs showed concentrations of PCBs that require further action. NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

SWMU 34

SWMU 34 consists of the Dumpster Area and ditches. In 1983, a leaking dumpster was observed in the Central Yard. The dumpster contained a catalyst from the Sulfur Recovery Unit. The spill was collected by absorbents. There were two drainage ditches near the Dumpster Area, one flowing along the southern side and the other along the western side. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for TCLP lead levels >5 mg/L and BaP concentrations >10 mg/kg in soil
- ISS for TCLP lead levels <5 mg/L, lead levels >800 mg/kg in soil, and lead concentrations >50 µg/L in groundwater and filing a deed notice afterwards
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for soils with BaP concentrations <10 mg/kg and >0.66 mg/kg
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2013 to address data gaps and evaluate the lead and BaP impacts identified in SWMU 34 soil during previous investigations. Buckeye, the Facility owner, had redevelopment plans to install a ladder track rail system in SWMU 34. This ladder track rail system rendered the impacted soils within SWMU 34 inaccessible to implement ISS/ESS CMs. In October 2013, Chevron submitted a Facility Alteration Notification letter to USEPA and NJDEP describing Buckeye's proposed redevelopment plan (Chevron 2013). After approval by USEPA and NJDEP, Chevron agreed to install a subsurface PRB wall as an interim measure to mitigate the migration of potential lead impacts in groundwater from SWMU 34. The SWMU 34 PRB IWP was submitted to the NJDEP and USEPA on November 14, 2013 (Chevron 2013). The PRB wall was constructed on November 19 and 20, 2013, and January 30 and 31, 2014. NJDEP approved the SWMU 34 PRB IWP in a letter dated December 18, 2013 (NJDEP 2013). The SWMU 34 PRB CCR was submitted to USEPA and NJDEP on September 13, 2016 (Chevron 2016). NJDEP provided comments on the SWMU 34 PRB CCR in a letter dated December 19, 2016 (NJDEP 2016). Chevron submitted a response to the NJDEP comments on June 12, 2017 (Chevron 2017), and NJDEP approved the SWMU 34 PRB CCR on July 28, 2017 (NJDEP 2017).

An additional ISS/ESS PDI was conducted in 2017 to further define the lead impacts in soil within SWMU 34. An ESS IWP for SWMU 34 was submitted to USEPA and NJDEP on December 12, 2017 (Chevron 2017). The CMs proposed for SWMU 34 included an engineering control consisting of a cap and an institutional control consisting of the establishment of a deed notice. USEPA and NJDEP provided comments on the ESS IWP in a letter dated May 14, 2018 (USEPA 2018). A revised SWMU 34 CM IWP was submitted to USEPA and NJDEP on October 25, 2018 (Chevron 2018). USEPA and NJDEP provided comments on the revised SWMU 34 CM IWP on February 8, 2019 (USEPA 2019). Chevron submitted a response to USEPA and NJDEP comments on April 16, 2019 (Chevron 2019) and approval was received on June 12, 2019 (USEPA 2019).

An ISCO PDI was conducted in 2018 to address data gaps and evaluate the benzene impacts identified in SWMU 34 soil during previous investigations. An NFI justification for benzene in soil and groundwater was submitted to USEPA and NJDEP on August 25, 2020 (Chevron 2020).

Arsenic-impacted soil associated with SWMU 34 is discussed in the Central *Yard Arsenic-Impacted Surficial Soil* section.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 34 include:

- Chevron. 2013. Notification of Planned Physical Alteration to the Facility. Central Yard Latter Track Rail System. October.
- Chevron. 2013. Interim Corrective Measure Implementation Work Plan – PRB for ISS/ESS. Solid Waste Management Unit 34. November.
- Chevron. 2016. Interim Corrective Measure. SWMU 34 Permeable Reactive Barrier Wall. Construction Completion Report. September.
- Chevron. 2017. Response to NJDEP Comments RAI #1. Construction Completion Report for Interim Corrective Measure SWMU 34. Permeable Reactive Barrier (PRB) Wall. June.
- Chevron. 2017. Ex Situ Stabilization Implementation Work Plan, SWMU 34. December.
- Chevron. 2018. SWMU 34 Corrective Measures Implementation Work Plan – Revision 1. Former Chevron Perth Amboy Facility. October.
- Chevron. 2019. Response to USEPA and NJDEP Comments. SWMU 34 Corrective Measures Implementation Work Plan, Rev 1. April.
- Chevron. 2020. Proposal for No Further Investigation for Benzene in Soil and Groundwater SWMU 34. August.

SWMU 35

SWMU 35 consists of the No. 4 separator impoundment. The unit was a surface impoundment used for oil/water separation. The unit is west of the ETP, between Tanks 327 and 330. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

The Arsenic Cap FDR was submitted in May 2013. The FDR proposed NFA for arsenic in SWMU 35 soil. NJDEP approved the FDR in a letter dated June 4, 2014.

An ISCO PDI was conducted in SWMU 35 in 2016 and 2017. An ISCO IWP for remediation of benzene impacts was submitted to USEPA and NJDEP in February 2018 (Chevron 2018). USEPA approved the IWP with comments on March 16, 2018 (USEPA 2018) and the DGW/PBR authorization was received from NJDEP on March 16, 2018 (NJDEP 2018). The IWP recommended excavation and enhanced bioremediation to remediate benzene-impacted soil and groundwater in SWMU 35. The CM was implemented from April 17 through June 29, 2018. Approximately 2,624 cubic yards of soil were excavated from SWMU 35 and disposed of in the CAMU. A total of 26,045

pounds of sulfate salts (in the form of gypsum) were added to each of the implementation areas to stimulate biological activity and enhance the remediation. Based on post-implementation results, a combined PMR/IWP and associated DGW/PBR request was prepared and submitted to USEPA and NJDEP on March 16, 2020 (Chevron 2020). USEPA provided comments on the PMR/CCR in an email on May 22, 2020, and Chevron submitted a response via email on May 29, 2020 (Chevron 2020). The DGW/PBR authorization for ISCO injections was received from NJDEP on June 18, 2020 (NJDEP 2020). The injection of approved reagents was initiated on June 23, 2020, and completed on September 11, 2020. A combined volume of 35,187 gallons of ISCO reagents were injected. The reagents included 8,631 gallons of 25% sodium hydroxide and 26,555 gallons of 18.5% sodium persulfate (approximately 46,737 pounds).

LNAPL impacts associated with SWMU 35 are discussed in the *LNAPL* section.

All deed notices are discussed in the *Deed Notices* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 35 include:

- Chevron. 2018. Remediation for Benzene Impacts Implementation Work Plan. Solid Waste Management Unit 35. February.
- Chevron. 2020. Permit-by-Rule Monitoring Report/Implementation Work Plan. Solid Waste Management Unit. 35. March.
- Chevron. 2020. Email response to USEPA Comments on the SWMU 35 Permit-by-Rule Monitoring Report/Implementation Work Plan. May.

SWMU 36

SWMU 36 is an earthen impoundment used for oil/water separation, between the East Yard Basin (SWMU 3) and the Arthur Kill. The impoundment measured approximately 200 feet long by 120 feet wide. An associated feeder ditch runs along the south side. The unit discharged to the Arthur Kill and was operational from the late 1940s to 1974. No records are available, and usage predated refinery release records. The CMs approved in the HSWA Permit Renewal are:

- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA is proposed for groundwater

An NFA justification for arsenic in surface soil was submitted to USEPA and NJDEP on January 28, 2019 (Chevron 2019). Inaccessible arsenic-impacted surface soil will be addressed with a facility-wide deed notice (see the *Engineering Controls* section for additional information).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 36 include:

- Chevron. 2019. No Further Action Justification for Arsenic in Surface Soil at Solid Waste Management Unit 36, Former Chevron Perth Amboy Facility. January.

SWMU 38

SWMU 38 consists of the area in the northwest section of the North Field that partially overlaps the northern end of SWMU 30. SWMU 38 was an open earthen impoundment that was identified on aerial photographs dated from 1947 to 1954. The type of waste SWMU 38 contained is unknown. The original unit was roughly elliptical in shape, measuring approximately 75 feet by 250 feet along its minor and major axes. However, the investigation area was expanded to a 125-foot by 250-foot rectangle to account for irregularities in the shape of the unit. The CMs approved in the HSWA Permit Renewal are:

- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg in soil
- Filing a deed notice for soils with BaP concentrations >0.66 mg/kg
- NFA for groundwater was granted on January 21, 2005

An ISS/ESS PDI was conducted in 2015 to address data gaps and evaluate the BaP impacts identified in SWMU 38 soil during previous investigations. Due to a discrepancy in the boring locations presented in the RFI and CMS reports, this PDI also involved the collection of soil samples from SWMU 30 to define BaP impacts in soil. The results of the SWMU 38 PDI and the proposed CM for SWMU 38 were presented in the September 2015 ESS IWP for the combined SWMU 30/38 Area (Chevron 2015). The ESS CM was implemented in SWMU 30 on October 27, 2015. Approximately 130 cubic yards of BaP-impacted soil were removed from SWMU 30 for disposal in the on-site CAMU. NJDEP approved the ESS IWP in a letter dated November 4, 2015 (NJDEP 2015). The SWMU 30/38 CCR was submitted to USEPA and NJDEP in June 2017 (Chevron 2017). Based on the 2015 PDI sampling results and the successful completion of the ESS CM in SWMU 30, Chevron recommended NFA for BaP impacts in SWMU 30 and SWMU 38 soil. The CCR was approved by NJDEP on July 24, 2017 (NJDEP 2017).

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 38 include:

- Chevron. 2015. Ex Situ Stabilization Implementation Work Plan. SWMU 30/38. September.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report. SWMU 30/38. June.

SWMU 39

SWMU 39 consists of an unnamed North Field Pond, which is an irregularly shaped area visible in several aerial photographs. This area was reportedly used as a landfarm for tank bottoms sludge (non-leaded) in the late 1960s. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Containment consisting of constructing a cap and filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil

- ISS for lead in soil and filing a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg

An ISS/ESS PDI was conducted in 2016 to identify data gaps and evaluate the lead and BaP impacts in soil. Given the proximity of SWMU 39 to AOC 5, the two units were addressed as one area and referred to as AOC 5/SWMU 39. The results of the PDI and the proposed CM were presented in an ISS/ESS IWP for the combined AOC 5/SWMU 39 area in 2016 (Chevron 2016). NJDEP provided comments on the AOC 5/SWMU 39 ISS/ESS IWP on November 17, 2016 (NJDEP 2016). Chevron provided a Revised IWP and letter responses to the NJDEP comments on February 24, 2017 (Chevron 2017). NJDEP approved the responses to comments in a letter dated March 24, 2017 (NJDEP 2017). ISS and ESS were implemented in AOC 5/SWMU 39 from September 11 through November 11, 2016, as proposed in the approved AOC 5/SWMU 39 ISS/ESS IWP. Approximately 2,645 cubic yards of soil were removed from the AOC 5/SWMU 39 ESS areas, and approximately 1,380 cubic yards of soil from the AOC 5/SWMU 39 ISS areas were stabilized in situ and remain in place. The excavated soil intended for disposal was transported directly to the Facility's on-site CAMU. The AOC 5/SWMU 39 ISS/ESS CCR was submitted to USEPA AND NJDEP on November 12, 2019 (Chevron 2019), and approval was received in a letter dated March 6, 2020 (USEPA 2020).

An ISCO PDI was conducted at AOC 5/SWMU 39 between 2014 and 2016. The PDI findings were summarized in an October 2016 letter to USEPA and NJDEP requesting NFA for benzene in soil at SWMU 39 and a transition to MNA for groundwater at SWMU 39 and AOC 5 (Chevron 2016). In a letter dated December 22, 2016, NJDEP approved the NFA for benzene in soil and provided comments for groundwater in AOC 5/ SWMU 39 (NJDEP 2016). Chevron provided responses to the NJDEP comments in a letter dated December 19, 2019 (Chevron 2019).

Arsenic-impacted soil associated with SWMU 39 is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

All deed notices are discussed in the *Deed Notices* section.

Submittals related to SWMU 39 include:

- Chevron. 2016. In Situ and Ex Situ Stabilization Implementation Work Plan. AOC 5/ SWMU 39. September.
- Chevron. 2016. Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at Solid Waste Management Unit 39 and Area of Concern 5. October.
- Chevron. 2017. Response to NJDEP Comments Response Action Item #1. ISS/ESS Implementation Work Plan – AOC 5/SWMU 39. February.
- Chevron. 2019. ISS and ESS CCR for AOC 5 and SWMU 39. November.
- Chevron. 2019. Response to NJDEP Comments on Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at Solid Waste Management Unit 39 and Area of Concern 5. December.

SWMU 40

SWMU 40 is a former surface impoundment that was used to manage process water and stormwater located near Tank 306. This impoundment was operational prior to 1940 through approximately 1967

and possibly to 1974. An oil/water separator was used in conjunction with the Old Pond. The oil/water separator recovered oil in a rectangular box, and suspended solids settled in the pond. The pond was nearly circular, with a diameter of approximately 175 feet. Tank 306 is currently in service for storage of ethanol and has historically held gasoline products. Minor amounts of LNAPL were found at three isolated locations in SWMU 40, approximately 60 feet apart. LNAPL is found primarily in lenses of highly porous and permeable catalyst beads that are contained within the low permeability clay fill. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- Excavation, ESS and disposal in the CAMU for BaP concentrations >10 mg/kg in soil
- In situ geochemical stabilization for arsenic groundwater concentrations >60 µg/L using direct injection and/or a reactive barrier wall
- MNA and filing a CEA for groundwater

An ISS/ESS PDI was conducted in 2014 to address data gaps and evaluate the BaP impacts identified in SWMU 40 soil during previous investigations. The results of the SWMU 40 PDI and the proposed CM for SWMU 40 were presented in the November 2015 ESS IWP (Chevron 2015). A supplemental ISS/ESS PDI was performed during fourth quarter 2015 to address data gaps and to evaluate the lead impacts identified in SWMU 40 soil during the 2014 LNAPL PDI. The results of the supplemental SWMU 40 PDI and the proposed CM for SWMU 40 were presented in an IWP Addendum, dated December 10, 2015 (Chevron 2015). ESS was implemented in SWMU 40 from December 8, 2015, through January 15, 2016. Approximately 1,359 cubic yards of soil were removed from SWMU 40 for disposal in the Facility's CAMU. Approximately 172 of the 1,359 cubic yards placed in the CAMU were mixed with EnviroBlend® 80/20 to stabilize lead in the soil. NJDEP approved the SWMU 40 ESS IWP and IWP Addendum and provided comments in a letter dated December 21, 2015 (NJDEP 2015). Chevron responded to the NJDEP comments in a letter dated September 30, 2016 (Chevron 2016). NJDEP provided additional comments on the SWMU 40 ESS IWP, IWP Addendum, and the responses to NJDEP comments in a letter dated December 12, 2016 (NJDEP 2016). The SWMU 40 CCR with responses to the additional NJDEP comments was submitted on November 1, 2017 (Chevron 2017). In the CCR, Chevron requested an NFA determination for BaP and lead in SWMU 40 soil. USEPA and NJDEP provided comments on the SWMU 40 ESS CCR on November 13, 2018 (USEPA 2018), and Chevron provided RTCs on October 31, 2019 (Chevron 2019). The SWMU 40 CCR was approved by USEPA and NJDEP in a letter dated February 6, 2020 (USEPA 2020).

In conjunction with SWMU 29 and SWMU 40, justification for NFA for arsenic in SWMU 16 groundwater was submitted to USEPA and NJDEP on March 18, 2020 (Chevron 2020).

An ISCO PDI was conducted between 2016 and 2018 to identify data gaps and evaluate benzene impacts in soil and groundwater. An IWP for the ISCO and excavation CMs at AOC 15 and SWMUs 6, 16, and 40 was submitted to USEP and NJDEP in February 2020 (Chevron 2020). USEPA and NJDEP provided comments in a letter dated May 21, 2020 (USEPA 2020) and Chevron submitted RTCs on June 5, 2020 (Chevron 2020). Additional comments were provided by

NJDEP in an email on July 30, 2020. Chevron provided an IWP Addendum and a response to the additional comments on August 5, 2020 (Chevron 2020). The discharge to groundwater authorization was received from NJDEP on August 12, 2020 (NJDEP 2020). The excavation CM (SWMUs 6, 16, and 40 only) was completed between March 2 and April 17, 2020, and the soil mixing event occurred between August 14 and September 1, 2020. Approximately 2,000 cubic yards of benzene-impacted soil were excavated and disposed of in the CAMU. ISCO soil mixing covered an approximately 20,000-square-foot area. The total quantities of calcium hydroxide and persulfate mixed in soil complied with the PBR/DGW authorization: 175,500 pounds of calcium hydroxide, 309,662 pounds of sodium persulfate, and 136,648 pounds of potassium persulfate.

LNAPL impacts associated with SWMU 40 are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 40 include:

- Chevron. 2015. Ex Situ Stabilization Implementation Work Plan. SWMU 40. November.
- Chevron. 2015. Implementation Work Plan Addendum. SWMU 40. December.
- Chevron. 2016. Response to NJDEP Comments. ESS Implementation Work Plan and Addendum – SWMU 40. September.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report. SWMU 40. November.
- Chevron. 2019. Response to USEPA/NJDEP Comments. ESS Construction Completion Report for SWMU 40. October.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. February.
- Chevron 2020. Response to USEPA Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. June.
- Chevron. 2020. In Situ Chemical Oxidation Implementation Work Plan Addendum for Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. August.
- Chevron. 2020. Justification for NFA for Arsenic in SWMUs 16, 29 and 40. March.

SWMU 41

SWMU 41 consists of a 200-foot by 400-foot bermed, at-grade impoundment in the North Field along Woodbridge Creek. The unit is a sludge drying area that appears in aerial photographs dating from 1952 through 1967 and again in 1974. Presently, the area is occupied by the ETP. Gravel surface surrounds the ETP structures. Several pipes run between the structures that prevent accessibility to some portions of the unit. SWMU 41 may have been used for storage of oily sludges and may be the source of LNAPL within this area. LNAPL was encountered in temporary well point HP-0081 along the northern edge of ETP Tank 9200 within SWMU 41, and the area was identified as an LNAPL area. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required

- ISS for lead in soil and filing a deed notice for BaP <10 mg/kg and >0.66 mg/kg
- A cap for arsenic in soil >20 mg/kg
- MNA and filing a CEA for groundwater

Due to their proximity to one another, a combined ISCO PDI was conducted in SWMU 24 and SWMU 41 between 2017 and 2018. An ISCO IWP for SWMU 24/41 and associated DGW/PBR request to treat benzene-impacted soil and groundwater was submitted to USEPA and NJDEP on February 11, 2019 (Chevron 2019). NJDEP provided comments on the SWMU 24/41 IWP via email on May 20, 2019, and Chevron provided a response to comments on May 28, 2019 (Chevron 2019). Chevron received NJDEP approval of the IWP and the DGW/PBR permit on May 29, 2019 (NJDEP 2019). The ISCO soil mixing CM was implemented from June 12 through September 16, 2019. Approximately 696 cubic yards of soil was treated using ISCO soil mixing. Treatment depth ranged from approximately 5.0 to 11.5 feet bgs. The total quantities of ISCO chemicals included: 27,625 pounds of calcium hydroxide, 52,896 pounds of sodium persulfate, and 23,142 pounds of potassium persulfate.

Given the overlap of SWMU 31 and SWMU 41, these units were addressed as one area referred to as SWMUs 31/41. An ISS/ESS PDI was conducted in 2016 to address data gaps and evaluate the lead and TEL impacts identified in SWMUs 31/41 soil during previous investigations. The results of the SWMUs 31/41 PDI were presented in a letter request for an NFA determination for lead and TEL in soil, dated September 7, 2016 (Chevron 2016). NJDEP approved the request in a letter dated November 18, 2016 (NJDEP 2016). See the *Engineering Controls* section for additional information on engineering controls used for lead-impacted soil at SWMUs 31/41.

Arsenic-impacted soil associated with SWMU 41 is discussed in the *Main Yard Arsenic-Impacted Surficial Soil* section.

LNAPL impacts associated with SWMU 41 are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 41 include:

- Chevron. 2016. Justification for No Further Action for Lead and TEL in Soil. Solid Waste Management Units 31 and 41. September.
- Chevron. 2019. In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 24/41. February.
- Chevron. 2019. Response to NJDEP Comments on the In Situ Chemical Oxidation Implementation Work Plan. Solid Waste Management Unit 24/41. May.

SWMU 42

SWMU 42 consists of a slightly below grade, crude concrete slab measuring approximately 25,000 square feet that supports a mostly aboveground network of petroleum pipe ways that have been in operation since 1973. There have been historical spills/releases. Of note was a 420-gallon heavy oil discharge from a failed 12-inch-diameter pipeline that was removed and disposed of off-site. Some

product was released into the adjacent soil. Tank 750, located just southeast of SWMU 42, historically stored gas and naphtha. In addition, there were Bulk Station Gasoline Pumps south of SWMU 42. This area is now considered PAOC 20 and is part of SWMU 42 and its associated LNAPL Area. The SWMU 42 LNAPL Area is bounded by the AOC 16 investigation area, EY1 LNAPL Area, and the East Yard Crude Slab to the north; Tank 750 to the east; the Bulk Station Gasoline Pump to the south; and the vacant Administration Building to the west. The LNAPL plume associated with SWMU 42 covers approximately 25,000 square feet at a thickness ranging from < 0.01 to 0.3 foot. The area was first identified in 2001 during the First Phase RFI when LNAPL was noted in a temporary well point. Odors and staining were observed in the fill in most of the temporary piezometers installed in SWMU 42. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- ISS for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and lead concentrations >50 µg/L in groundwater and filing a deed notice afterwards
- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- ISCO treatment for benzene concentrations >100 µg/L in groundwater, supplemented by enhanced bioremediation, if required
- MNA and filing a CEA for groundwater

A justification for NFI or remediation for benzene in soil and groundwater was submitted to USEPA and NJDEP on September 14, 2020 (Chevron 2020).

An ISS/ESS PDI was conducted in 2015 to address data gaps and evaluate the lead and BaP impacts identified in SWMU 42 soil during previous investigations. The results of the SWMU 42 PDI and the proposed CM for SWMU 42 were presented in the February 2016 (Chevron 2016). ESS was implemented in SWMU 42 on February 23 and March 1, 2016. Approximately 190 cubic yards of lead-impacted soil were stabilized and removed from SWMU 42. The excavated soil was transported directly to the Facility's on-site CAMU for disposal. The excavation area was backfilled with certified clean material. NJDEP approved the SWMU 42 ESS IWP in a letter dated March 21, 2016 (NJDEP 2016). The SWMU 42 CCR was submitted to the USEPA and NJDEP on September 26, 2017 (Chevron 2017) and recommended NFA for lead in SWMU 42 soil. The CCR was approved on December 27, 2017 (USEPA 2017).

A justification for NFA for lead in soil in SWMU 42 East was submitted to USEPA and NJDEP on April 11, 2018 (Chevron 2018). The lead-impacted soil identified during the LNAPL EY1 PDI is being addressed as SWMU 42 East. USEPA and NJDEP accepted the proposal to address the lead-impacted soil under the Industrial Site Recovery Act (ISRA) AOC for Site-Wide Historic Fill Material (see the *Engineering Controls* section for additional information).

The SWMU 42 South justification for NFI for lead in soil was submitted to the USEPA and NJDEP on March 18, 2020 (Chevron 2020). This area was not listed in the HSWA Permit Renewal as an area requiring remediation under the CMI. However, the lead impacts are being addressed under the CMI because they were identified during a CMI soil investigation. Since this area of lead-impacted soil is just south of SWMU 42, it has been associated with SWMU 42 but has been

designated as SWMU 42 South because it is not contiguous with the SWMU 42 boundary presented in the CMS.

All deed notices are discussed in the *Deed Notices* section.

LNAPL impacts associated with SWMU 42 are discussed in the *LNAPL* section.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 42 include:

- Chevron. 2016. Ex Situ Stabilization Implementation Work Plan. SWMU 42. February.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report. SWMU 42. September.
- Chevron. 2018. Justification for No Further Action for Lead in Soil. Solid Waste Management Unit 42 East. April.
- Chevron. 2020. Justification for No Further Investigation for Lead in Soil. Solid Waste Management Unit 42 South. March.
- Chevron. 2020. Justification for No Further Investigation or Remediation for Benzene in Soil and Groundwater. Solid Waste Management Unit 42. September.

SWMU 43

SWMU 43 consists of a below-grade surface impoundment that was in operation between 1955 and 1975. The specific wastes managed in the unit are unknown. Dredged material from the Surge Pond (SWMU 2), the No. 4 Separator (SWMU 35), and Old Pond (SWMU 40) may have been placed in this unit in late 1956 or early 1957. SWMU 43 was also used as a spent catalyst disposal area in the mid-1950s. The area also appears designed to manage oily stormwater and process water. During its use, SWMU 43 received RCRA-listed hazardous wastes F037, F038, KO51, and K052. The impoundment was taken out of service and filled in 1977. SWMU 43 measures approximately 61,974 square feet where two former waste ponds once existed beneath the existing concrete pad and beyond. Historical photographs show the presence of an earthen wall that surrounded and separated the mudflats into two ponds. The SWMU 43 LNAPL Area is the result of different sludge disposal activities at SWMU 43. These sludges may have originated from the OWSS, tank bottoms, and other sources. Based on laboratory analysis, the LNAPL is a mixture of crude oil, gasoline, and diesel. The CMs approved in the HSWA Permit Renewal are:

- ISCO treatment for organic contaminants in soil, supplemented by enhanced bioremediation, if required
- ISS for lead in soil, installation of a non-RCRA cap, and filing a deed notice afterwards
- Continued LRMs for groundwater, until all the LNAPL is removed to the extent practicable
- MNA and filing a CEA for groundwater

Since the boundaries of SWMU 5, SWMU 21, and SWMU 43 overlap, a PDI was conducted in 2017 and 2018 to evaluate all PCOCs in these units concurrently. A CM IWP and associated DGW/PBR request were submitted to USEPA and NJDEP on September 28, 2018 (Chevron 2018). The IWP

proposed ISS, ISCO soil mixing, and application of bioremediation amendments to address lead- and benzene-impacted soil and benzene-impacted groundwater. Comments were received from USEPA and NJDEP on February 8, 2019 (USEPA 2019) and Chevron provided a response to the USEPA and NJDEP comments, along with an IWP Addendum, on June 20, 2019 (Chevron 2019). USEPA approved the IWP on July 13, 2019 (USEPA 2019), and NJDEP issued the DGW/PBR permit on July 19, 2019 (NJDEP 2019). The ISS, ISCO soil mixing, and bioremediation CMs were implemented in SWMU 43 in September and October 2019. Approximately 3,980 cubic yards of lead-impacted soil were stabilized (ISS). ISCO soil mixing was completed in approximately 2,470 cubic yards of benzene-impacted soil, and bioremediation amendments were added to approximately 2,360 cubic yards of soil. The total quantities of chemical added complied with the PBR/DGW authorization and were as follows: 117,914 pounds of sodium persulfate, 79,344 pounds of potassium persulfate, 74,737 pounds of calcium hydroxide, 219,600 pounds of gypsum, 4,000 pounds of apatite, and 200 pounds of diammonium phosphate.

The SWMU 5/21/43 capping CM Final Design Report was submitted to USEPA and NJDEP on April 7, 2020 (Chevron 2020). The SWMU 43 cap construction began in April 2020 and was completed in August 2020. The construction of the SWMU 43 cap involved excavation for the installation of the perimeter stormwater drainage system, importation of certified clean fill material, grading, and installation of the various elements of the cap. Excavation was performed along the northern and eastern sides of the proposed cap area to confirm the location and elevation of the existing sheetpile wall. A drainage system was constructed around the perimeter of the SWMU 43 cap area to convey stormwater runoff from the capped area to tank basins located to the west and south of the capped area. Soil excavated from the perimeter of SWMU 43 for the construction of the perimeter drainage system was placed within the footprint of the cap area. The excavated material was used as general fill to raise the grade to achieve the required subgrade elevation. The drainage system outfalls located within adjacent tank basins were constructed with gabion mattresses to protect the PVC drain pipes and to prevent erosion of soil adjacent to the pipe outfalls. The SWMU 43 cap, from bottom to top, consists of a sandy soil cushion layer, geomembrane, geocomposite drainage media, sandy soil drainage layer, woven geotextile separator, and a gravel cover. The SWMU 43 Cap CCR was submitted to USEPA and NJDEP on December 11, 2020 (Chevron 2020).

LRMs are currently ongoing.

MNA requirements associated with this area are discussed in the Monitored Natural Attenuation Plan section.

Submittals related to SWMU 43 include:

- Chevron. 2018. Corrective Measure Implementation Work Plan for SWMU 5/21/43. September.
- Chevron. 2019. Response to Comments. Corrective Measures Implementation Work Plan Addendum for SWMU 5/21/43. June.
- Chevron. 2020. Justification for NFA for Arsenic in SWMU 5 Groundwater. March.
- Chevron. 2020. Capping Corrective Measure Final Design Report – SWMU 43. April.
- Chevron. 2020. SWMU 43 Cap Construction Completion Report. December.

SWMU 44

SWMU 44 is in the Main Yard, under the present position of the utility plant, control house, and various pipe trenches. The location and size of the unit are based on aerial photographs, which show the unit to be approximately 245 feet long by 200 feet wide at the narrow end and 350 feet wide at the wider end. It appears to be a below grade earthen impoundment that may have been used for the management of process water and stormwater. The impoundment operated from prior to 1932 to 1950. The waste products are oily process water and stormwater. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg
- NFA was proposed and granted for groundwater

All deed notices are discussed in the *Deed Notices* section.

SWMU 45

SWMU 45, also called the "Kidney Pond," is a below-grade earthen impoundment measuring approximately 150 feet by 50 feet with a partial dike in the middle. SWMU 45 was constructed sometime in the mid-1950s and was shut down between 1974 and 1977. Operational history is unknown and predates release records, but the impoundment probably handled oil/sludges from the oil-water separator (SWMU 36) or its associated ditch. Historical waste volumes are unknown. SWMU 45 has been grouped with SWMU 3 (East Yard Basin), which has been closed under NJDEP supervision and is being monitored by NJDEP (see SWMU 3 discussion).

SWMU 51

SWMU 51 was constructed in 1990 and consists of an oily soil pad. This unit is an asphalt pad in the Main Yard, south of Tank 311, that is used for the temporary staging of non-hazardous soil excavated during on-site spill responses or encountered during on-site construction and demolition activities. The unit is underlain by a polyethylene liner and equipped with a valve-accessed catch basin for the collection and control of stormwater. The catch basin drains to the OWSS. It has been determined that no hazardous wastes are managed at the SWMU. Per the HSWA Permit Renewal, NFA was proposed and granted for groundwater.

SWMU 52

SWMU 52 is a potential TEL burial area southwest of Tank 13. Since there were no exceedances of the applicable NRDCSCC and NRDCSRS in any analytical results for soil samples, it does not appear that this location was used for disposal of TEL wastes. Therefore, NFA for soils was recommended at SWMU 52 in the November 2003 RFI Report. Groundwater conditions at SWMU 52 were investigated during the CMS, and there were no exceedances. Additionally, no LNAPL is present within this SWMU. NFA was proposed in the HSWA Permit Renewal for both soil and groundwater.

SWMU 53

SWMU 53 consists of the area south and east of the concrete splash pad of Tank Basin 312 in the North Field. It was identified as a SWMU based on procedures employed at the Fire Fighting Training Grounds (FFTG). The FFTG was fueled with naphtha, which may have become entrained in the water used to extinguish the fires. The naphtha-impacted water was drained and discharged into Tank Basin 312, then to the OWSS for conveyance to the ETP for treatment. The CMs approved in the HSWA Permit Renewal are:

- Filing a deed notice for BaP concentrations <10 mg/kg and >0.66 mg/kg in soil
- NFA is proposed for groundwater

All deed notices are discussed in the *Deed Notices* section.

CAMU

Closure of the CAMU Cells 1 and 2 was completed in September 2020. Installation of the drainage layer of soil was completed, the geotextile was installed, and the final layer of coarse gravel was placed and graded. The spillway was constructed and stabilized with the installation of the Fabriform cover. CAMU Cell 3 was not needed for the implementation of the CMI; therefore, Cell 3 was not constructed.

Submittals related to the CAMU include:

- Chevron. 2013. Final Design Report – Corrective Action Management Unit. November.
- Chevron. 2020. CAMU Closure IFC Drawings and CQA Plan. July.

Main Yard Arsenic-Impacted Surface Soil

The HSWA Permit Renewal recommended capping for arsenic concentrations greater than 20 mg/kg in AOCs 6c, 16A, 23, 34, 44, 47, 49 and SWMUs 16, 19, 20, 24, 27, 35, 39, and 41 (USEPA 2013). An NFA justification report for arsenic in surface soil within the Main Yard of the Facility was submitted to USEPA and NJDEP on February 26, 2019 (Chevron 2019). The USEPA approved the NFA request on July 30, 2019 (USEPA 2019).

Submittals related to arsenic-impacted surficial soil include:

- Chevron. 2019. No Further Action Report for Arsenic in Surface Soil: Main Yard, Former Chevron Perth Amboy Facility. February.

Central Yard Arsenic-Impacted Surface Soil

The HSWA Permit Renewal recommended capping for arsenic concentrations greater than 20 mg/kg in AOC 40 and SWMU 34 (USEPA 2013). An NFA justification report for arsenic in surface soil within the Central Yard of the Facility was submitted to USEPA and NJDEP on April 23, 2019 (Chevron 2019). The USEPA approved the NFA request on July 26, 2019 (USEPA 2019).

Submittals related to arsenic-impacted surficial soil include:

- Chevron. 2019. No Further Action Report for Arsenic in Surface Soil: Central Yard, Former Chevron Perth Amboy Facility. April.

East Yard Arsenic-Impacted Surficace Soil

The 2013 HSWA Permit Renewal recommended implementing a cap and subsequently filing a deed notice to address arsenic concentrations greater than 20 mg/kg in surface soil in the following areas in the East Yard: AOCs 6B, 6C, 13, 14, 16B, 26, 27, 31, 35, 38, 39, 45, 46 and SWMUs 10, 26, and 36. An NFA justification related to arsenic in surface soil in the East Yard of the Facility was submitted to USEPA and NJDEP on June 1, 2020 (Chevron 2020). These areas either had a previously approved NFA, were recommended for NFA following the capping CM, or were recommended for NFA following a PDI.

Submittals related to arsenic-impacted surficial soil include:

- Chevron. 2020. No Further Action Report for Arsenic in Surface Soil: East Yard, Former Chevron Perth Amboy Facility. June.

LNAPL

LNAPL has been historically observed at 22 LNAPL areas in the Facility's Main Yard, Central Yard, and East Yard.

An LNAPL PDI was conducted in SWMU 42 between November and December 2013. The PDI concluded that LNAPL in SWMU 42 had been delineated (Chevron 2016). Chevron received comments from NJDEP via email in First Quarter 2017. Chevron provided responses to the NJDEP comments on August 8, 2017 (Chevron 2017) and USEPA and NJDEP approved the responses on September 29 and October 13, 2017 (NJDEP 2017). LRMs in SWMU 42 are currently ongoing.

The PAOC 15 LNAPL Area is associated with AOC 6B. An LNAPL PDI was submitted to NJDEP in 2016 (Chevron 2016) and Chevron received comments from NJDEP via email on January 11, 2017. Chevron provided responses to the NJDEP comments on August 8, 2017 (Chevron 2017), and USEPA and NJDEP approved the responses on September 29 and October 13, 2017 (NJDEP 2017). LNAPL delineation has been completed and LRMs at the PAOC 15 LNAPL Area are ongoing.

A PDI summary for the EY3 LNAPL Area was submitted to USEPA and NJDEP in November 2016 (Chevron 2016). Chevron received comments from NJDEP via email on January 11, 2017 and submitted responses to the NJDEP comments on August 8, 2017 (Chevron 2017). An NFA request for LNAPL and LNAPL-related groundwater was submitted with the responses.

An LNAPL PDI summary was submitted to NJDEP for the AOC 19 LNAPL area and concluded that LNAPL had been delineated. The PDI summary was approved on October 13, 2017 (USEPA 2017).

In August 2017, eight LNAPL PDI summary reports were submitted to USEPA and NJDEP for the following LNAPL areas: EY4a, EY4b, NF3, NF4, NF4, SSPL, SWMU 40, and SWMU 41 (Chevron 2017). Comments on the PDI summary reports were provided by USEPA and NJDEP on July 26, 2019 (USEPA 2019) and Chevron provided a response to comments in August 2020 (Chevron 2020).

Additionally, the AOC 8-NF6 LNAPL PDI Summary was submitted to NJDEP in September 2020 (Chevron 2020).

LRMs are currently ongoing in the following LNPAL Areas: NF2, SWMU 43, NF3, NF4, NF5, AOC 8-NF6, AOC 19, SWMU 40, SWMU 41, SWMU 42, AOC 31, PAOC 15, EY4a, EY4b, SSPL, SWMU 10, and AOC 25.

In summary, submittals related LNAPL impacts include:

- Chevron. 2016. Pre-Design Investigation Summary, PAOC 15 LNAPL Area. November.
- Chevron. 2016. Pre-Design Investigation Summary, EY3 LNAPL Area. November.
- Chevron. 2016. Pre-Design Investigation Summary, SWMU 42 LNAPL Area. November.
- Chevron. 2017. LNAPL PDI Summary Report. August.
- Chevron. 2017. Response to NJDEP email comments of 1/11/17 on Chevron's Third Quarter 2016 Progress Report. August.
- Chevron. 2020. Pre-Design Investigation Report, AOC 8-NF6 LNAPL Area. September.

Engineering Controls

Compliance averaging to evaluate compliance with CMI action levels was first proposed by Chevron for use at the Facility in a letter to the USEPA dated June 26, 2015. On August 13, 2019, Chevron submitted a letter to NJDEP and USEPA discussing the usage of NJDEP Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria, Version 1.0. to achieve CMI action levels for lead, arsenic, and benzene in soil in select areas – SWMU 8, SWMU 42 East, SWMU 31/41, SWMU 11B, SWMU 31/41, AOC 14/26, AOC 6C and AOC 16B Area 3. On November 14, 2019, USEPA and NJDEP provided draft comments on these submittals and provided approval on AOC 16B Area 3.

A response to USEPA and NJDEP comments was submitted on February 13, 2020 (Chevron 2020) and approval was received on March 27, 2020 (NJDEP 2020) for the areas listed below.

- AOC 31: Justification for No Further Action for Lead in Soil, dated July 6, 2017
- SWMU 8: Ex Situ Stabilization Construction Complete Report, dated April 12, 2018
- AOC 14/26: Implementation Work Plan, dated October 16, 2017
- AOC 16B Area 1: Ex Situ Stabilization Implementation Work Plan, dated August 2017
- SWMU 36: Justification for No Further Action for Arsenic in Soil, dated January 28, 2019
- AOC 6C: No Further Action Justification for Arsenic in Surface Soil, dated March 4, 2019
- SWMU 11B: Justification for No Further Action for Lead in Soil, dated December 5, 2016
- SWMU 42: Justification for No Further Action for Lead in Soil, dated April 11, 2018
- AOC 14: Justification for No Further Action for Lead and BaP in Soil, dated May 30, 2017
- SWMU 31/41: Justification for No Further Action for Lead and Tetraethyl lead in Soil, dated September 7, 2016
- AOC 16B: Justification for No Further Investigation for Lead and BaP in Soil, dated December 11, 2018

- Use of NJDEP Technical Guidance for Attainment of Remediation Standards and Site-Specific Criteria and Proposed Compliance Averaging at SWMU's 8, 42 East, 31/41, 11B, and AOC's 31, 14, 14/26, 16B, 6C, 16B Area 3, dated February 13, 2020

Submittals related to engineering controls include:

- Chevron. 2020. Response to USEPA/NJDEP Comments for Use of NJDEP Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria, dated August 13, 2019 and Proposed Compliance Averaging at SWMUs 8, 42 East, 31/41, 11B and AOCs 31, 14, 14/26, 16B, 6C, 16B Area 3. February.

ADDITIONAL REGULATORY SUBMITTALS

The following documents were not related to any specific AOC or SWMU but were submitted under the CMI.

Deed Notice

A draft Central Yard deed notice was submitted to NJDEP and USEPA on February 27, 2019 (Chevron 2019), and Chevron received comments from USEPA on June 7, 2019 (USEPA 2019). A response to comments and Revision 1 to the previously submitted draft was submitted for USEPA and NJDEP review and approval on October 8, 2019 (Chevron 2019).

Draft deed notices for the East Yard and Main Yard were submitted to the USEPA and NJDEP on April 24, 2020 (Chevron 2020).

Submittals related to the deed notice include:

- Chevron 2019. Draft Central Yard Deed Notice. February.
- Chevron. 2019. Draft Central Yard Deed Notice – Revision 1. October.
- Chevron. 2020. Draft Deed Notices for the East Yard and Main Yard. May.

Sediment Investigation

A Final Supplemental Sediment Investigation Report (FSSIR) was submitted to USEPA and NJDEP in May 2020 (TRC 2020) that provided results and an evaluation of the investigations of Spa Spring Creek, Woodbridge Creek, and the Arthur Kill. These investigations were completed between 2002 and 2019 and included bathymetric surveys and profiling of sediment surfaces and field and laboratory analysis of sediment and surface water samples. The purpose of the FSSIR was to provide sufficient information to complete the compliance requirements of the HSWA Permit Renewal for the investigation of subject water bodies. The FSSIR concluded that sediment quality has been characterized and the delineation of soft sediments is complete; therefore, not further investigation of the water bodies was proposed.

In summary, submittals related to the sediment investigation include:

- TRC. 2020. Final Supplemental Sediment Investigation Report. May.

Monitored Natural Attenuation Plan

On September 28, 2018, Chevron submitted an MNA IWP to USEPA and NJDEP to summarize the status of benzene MNA, demonstrate MNA is reducing site benzene and other constituents as expected, and provide a Facility-wide monitoring plan for MNA parameters (Chevron 2018). USEPA provided comments on the MNA IWP on July 26, 2019 (USEPA 2019) and Chevron provided responses to the USEPA comments, along with a revised IWP, on December 12, 2019 (Chevron 2019). The monitoring well network required to monitor MNA is constructed and in-place at the facility.

Submittals related to the MNA Plan include:

- Chevron. 2018. Monitored Natural Attenuation Implementation Work Plan. September.
- Chevron. 2019. Response to USEPA Comments, dated July 26, 2019. Monitored Natural Attenuation Implementation Work plan, dated September 28, 2018. December.

AGENCY REFERENCES

NJDEP. 2012. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility: AOC 36. October 11.

NJDEP. 2013. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility: SWMU 8. February 25.

NJDEP. 2013. Review of Chevron's June 27, 2013 Justification for No Further Action (NFA) for Solid Waste Management Unit 12 (SWMU 12) for Soils. September 9.

NJDEP. 2013. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility: AOC 36 (MW-216/MW-220 area, MW-169R area). September 13.

NJDEP. 2013. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility: AOC 44. November 20.

NJDEP. 2013. NJDEP review of Chevron's November 13, 2013 Interim Corrective Measure Implementation Work Plan for the Passive Reactive Barrier Wall, In Situ and Ex Situ Stabilization, Solid Waste Management Unit (SWMU) 34. December 18.

NJDEP. 2014. Review of Chevron's December 16, 2013 Justification for No Further Action (NFA) for Solid Waste Management Unit 15 (SWMU 15) for Soils. February 10.

NJDEP. 2014. Approval letter. Final Design Report for Arsenic Cap. June 4.

NJDEP. 2015. Chevron's Construction Completion Report – 5 Berth Revetment System, July 30, 2015. August 25.

NJDEP. 2015. Chevron's August 7, 2015 ISS/ESS Implementation Work Plan – SWMU 6, Chevron's October 20, 2015 Response to Comment Document. October 27.

NJDEP. 2015. Chevron's September 28, 2015 ESS Implementation Work Plan for Solid Waste Management Unit (SWMU) 30/38. November 4.

NJDEP. 2015. Chevron's August 2015 ISS/ESS Implementation Work Plan – SWMU 11A, Chevron's November 11, 2015 (received December 4, 2015) Response to Comment Document. December 14.

NJDEP. 2015. Chevron's November 13, 2015 ESS Implementation Work Plan for Solid Waste Management Unit (SWMU) 40. Chevron's December 10, 2015 ESS Implementation Work Plan Addendum for Solid Waste Management Unit (SWMU) 40. December 21.

NJDEP. 2015. Chevron's November 20, 2015 ISS Implementation Work Plan for Area of Concern (AOC) 33. December 22.

NJDEP. 2015. Chevron's October 15, 2015 ESS Implementation Work Plan for Solid Waste Management Unit (SWMU) 8. December 17.

NJDEP. 2016. Chevron's January 2016 Ex Situ Stabilization (ESS) Implementation Work Plan. SWMU 16. March 9.

NJDEP. 2016. Chevron's Ex Situ Stabilization (ESS) Implementation Work Plan, SWMU 42, February 8, 2016. March 21.

NJDEP. 2016. Letter to Chevron, NJDEP review of Ex Situ Stabilization Implementation Work Plan. SWMU 10. May 16.

NJDEP. 2016. Letter to Chevron, In situ and Ex Situ Stabilization Implementation Work Plan. June 8.

NJDEP. 2016. Letter to Chevron, NJDEP review of (1) Chevron's May 2013 FDR - Arsenic Cap-East, Main and Central Yards, (2) Chevron's April 23, 2014 Response to Comment Document, Former Chevron Perth Amboy Refinery, Chevron USA, Inc. June.

NJDEP. 2016. Chevron's Area of Concern 25 (AOC 25) Implementation Work Plan August 4, 2016. September 28.

NJDEP. 2016. Letter to Chevron, Chevron's ISS/ESS IWP AOC 29, July 29, 2016. September 28.

NJDEP. 2016. Chevron's Justification for No Further Action (NFA) for Tetraethyl lead in Soil at Solid Waste Management Unit (SWMU) 22, August 18, 2016. October 12.

NJDEP. 2016. Chevron's Justification for No Further Action (NFA) for Tetraethyl lead in Soil at Solid Waste Management Unit (SWMU) 26, August 18, 2016. October 20.

NJDEP. 2016. Chevron's ISS and ESS Implementation Work Plan for SWMU 27/29, August 18, 2016. November 2.

NJDEP. 2016. Chevron's In Situ and Ex Situ Stabilization (ISS & ESS) Implementation Work Plan – AOC 5/SWMU 39 – September 29, 2016. November 17.

NJDEP. 2016. Chevron's Justification for No Further Action (NFA) for Lead and Tetraethyl lead in Soil at Solid Waste Management Unit (SWMU) 31 and 41, September 7, 2016. November 18.

NJDEP. 2016. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility SWMU 11B. November 30.

NJDEP. 2016. Chevron's – (1) ISS/ESS Implementation Work Plan – SWMU 7, April 2016, (2) Response to the NJDEP's June 8, 2016 Comments RAI #1 ISS/ESS Implementation Work Plan – SWMU 7, October 13, 2016. December 5.

NJDEP. 2016. Chevron's – (1) ISS/ESS Implementation Work Plan – SWMU 20, May 25, 2016, (2) Response to the NJDEP's June 8, 2016 Comments RAI #1 ISS/ESS Implementation Work Plan – SWMU 20, October 13, 2016. December 5.

NJDEP. 2016. Chevron's (1) ESS Implementation Work Plan – SWMU 10, March 29, 2016, (2) Response to the NJDEP's May 16, 2016 Email Comments RAI #1 ESS Implementation Work Plan – SWMU 10, October 13, 2016. December 6.

NJDEP. 2016. Chevron's – September 30, 2016 Response to NJDEP December 21, 2015 Comments, ESS Implementation Work Plan and Addendum – SWMU 40. December 12.

NJDEP. 2016. Chevron's Ex Situ Stabilization (ESS) Implementation Work Plan (IWP) for SWMU 19, October 6, 2016. December 16.

NJDEP. 2016. Chevron's Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at SWMU 19, October 17, 2016. December 16.

NJDEP. 2016. Chevron's – Construction Completion Report for the Interim Corrective Measure SWMU 34 Permeable Reactive Barrier (PRB) Wall, September 13, 2016. December 19.

NJDEP. 2016. Chevron's – Justification for Transition to Monitored Natural Attenuation/No Further Action for Benzene Impacts at Solid Waste Management Unit 39 and Area of Concern 5, October 17, 2016. December 22.

NJDEP. 2017. Approval Letter. Chevron's Justification for No Further Action (NFA) for Lead in Soil at Solid Waste Management Unit (SWMU) 11B, December 5, 2016. January 10.

NJDEP. 2017. Comments Letter. Chevron's Justification for No Further Action for Lead in Soil at SWMU 37, December 1, 2016. January 13.

NJDEP. 2017. Letter to Chevron. Approval of ISS/ESS IWP and RTC, AOC 5/SWMU 39. March 24.

NJDEP. 2017. Discharge to Groundwater Authorization. Former Chevron Perth Amboy Facility – AOC 31 South. May.

NJDEP. 2017. Chevron's In Situ (ISS) and Ex Situ Stabilization (ESS) Implementation Work Plan (IWP) for AOC 23, AOC 41, and SWMU 18. May 10.

NJDEP. 2017. Approval Letter. Chevron's In Situ Chemical Oxidation Permit-by-Rule Monitoring Report, Solid Waste Management Unit (SWMU) 10, April 26, 2017. May 30.

NJDEP. 2017. Letter to Chevron. Chevron's AOC 50 South CM IWP, April 18, 2017. June 14.

NJDEP. 2017. Letter to Chevron. Chevron's ISS CCR for AOC 33, June 14, 2017. July 5.

NJDEP. 2017. Chevron's Justification for No Further Action (NFA) for Lead and BaP in Soil, May 30, 2017. July 5.

NJDEP. 2017. Chevron's Justification for No Further Action for TEL in Soil – Solid Waste Management Unit (SWMU) 24, June 22, 2017. July 24.

NJDEP. 2017. Chevron's ESS Construction Completion Report for SWMU 30/38, June 13, 2017. July 24.

NJDEP. 2017. Letter to Chevron. (1) AOC 50 South CM IWP, April 18, 2017, (2) Response to NJDEP Comments RAI #1, CM IWP - AOC 50 South, July 12, 2017. July 28.

NJDEP. 2017. Letter to Chevron. Approval of ISS/ESS SWMU 34 PRB CCR. July 28.

NJDEP. 2017. Letter to Chevron. Chevron's ISS and ESS IWP for AOC 28, June 19, 2017. July 31.

NJDEP. 2017. Approval Letter to Chevron. Response to NJDEP Email Comments on 1/11/17 on Chevron's Third Quarter 2016 Progress Report, dated August 8, 2017. September and October.

NJDEP. 2017. Discharge Approval and Monitoring Requirements Associated with Permit-by-Rule Discharge Authorization for Chevron Perth Amboy Facility: AOC 39. November 9.

NJDEP. 2018. Letter to Robert Mancini (Chevron), ESS IWP, AOC 16B Area 1, dated August 29, 2017. February 21.

NJDEP. 2018. Letter to Robert Mancini (Chevron), ISS/ESS PDI Summary and Justification for NFA - AOC 46, dated December 12, 2017. March 14.

NJDEP. 2018. Discharge to Groundwater Authorization, Solid Waste Management Unit 35. March 16.

NJDEP. 2018. Discharge to Groundwater Authorization, Former Chevron – Perth Amboy. AOC 36 MW-216/220 Area, MW-367 EISB Treatment Areas. June 14.

NJDEP. 2018. Email to Chevron, Chevron - April 2018 AOC 31N (Tank 772/773 and King Street) Work Plan and PBR Proposal. June 22.

NJDEP. 2018. Letter to Chevron. ISCO IWP for AOC 31N, dated April 16, 2018, New Jersey Discharge Elimination System, DGW/PBR Authorization Requests for Tank Basins 772/773 Treatment Area and King Street Treatment Area, dated April 16, 2018. July 3.

NJDEP. 2018. Letter to Chevron – Approval. Remediation for Benzene Impacts, Implementation Work Plan, Area of Concern 9A, dated November 6, 2017. September 4.

NJDEP. 2018. Discharge Approval and Monitoring Requirements Associated with Permit-By-Rule Discharge Authorization for Chevron Perth Amboy Facility – SWMU 8. December 19.

NJDEP. 2019. 1. In Situ Chemical Oxidation Implementation Work plan, Area of Concern EY1, dated October 11, 2018. 2. Discharge to Groundwater Permit by Rule Authorization Request, dated October 11, 2018. 3. Response to USEPA March 15, 2019 Comments on the October 2018 In Situ Chemical Oxidation Implementation Work Plan Area of Concern 16 EY1, dated April 9, 2019. April 18.

NJDEP. 2019. 1. In Situ Chemical Oxidation Implementation Work Plan, Solid Waste Management Unit 24/41, dated February 11, 2019. 2. Discharge to Groundwater Permit-by-Rule Authorization Request, dated February 22, 2019. 3. Response to NJDEP May 20, 2019 Comments submitted via email, dated May 28, 2019. May 20.

NJDEP. 2019. Discharge Approval and Monitoring Requirements Associated with the Permit-by-Rule Discharge to Groundwater Authorization for Chevron Perth Amboy Facility – SWMU 24/41. May 29.

NJDEP. 2019. Discharge to Groundwater Authorization. Chevron Perth Amboy Facility – SWMU 5/21/43. July 19.

NJDEP. 2019. Discharge to Groundwater Authorization. Chevron Perth Amboy Facility – AOC 31 South. September 3.

NJDEP. 2019. Discharge to Groundwater Authorization, Chevron Perth Amboy Facility – AOC 9A. November.

NJDEP. 2020. Discharge to Groundwater Authorization. Chevron Perth Amboy Facility – AOC 44. February 19.

NJDEP. 2020. Approval Letter. Use of NJDEP Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria and SWMUs 8, 42 East, 31/41, 11B and AOCs 31, 14, 14/26, 16B, 6C, 16B Area 3. March 27.

NJDEP. 2020. Discharge to Groundwater Authorization, Chevron Perth Amboy Facility – AOC 14/SWMU 26. April 16.

NJDEP. 2020. In Situ Chemical Oxidation (ISCO) Implementation Work Plan (IWP) for AOC 15 and SWMUs 6, 16, and 40, dated February 26, 2020. May 21.

NJDEP. 2020. Discharge to Groundwater Authorization. Chevron Perth Amboy Facility – SWMU 35. June 18.

NJDEP. 2020. Discharge to Groundwater Authorization – AOC 15, SWMU 6-16-40. August 12.

NJDEP. 2020. Discharge to Groundwater Authorization – AOC 23, AOC 41, SWMU 18. September 17.

NJDEP. 2020. Permit/Approval. Preconstruction Permit and Certificate to Operate. September 24.

USEPA. 2013. Final RCRA Corrective Action Permit Renewal. July.

USEPA. 2017. Letter to Chevron. Response to NJDEP Comments RAI# 2, CM IWP AOC 50 South, dated August 31, 2017. October 13.

USEPA. 2017. Response to NJDEP Email Comments on 1/11/17 on Chevron's Third Quarter Progress Report, dated August 8, 2017. October 13.

USEPA. 2017. 1. Implementation Work Plan Area of Concern 39, dated October 6, and 2. Discharge to Groundwater Permit-by-Rule Authorization Request, dated October 6, 2017. November 7.

USPEA. 2017. Letter to Chevron, ISS/ESS CCR for SWMU 16 dated September 6, 2017. November 17.

USEPA. 2017. Letter to Chevron, ISS/ESS CCR for SWMU 6 dated September 6, 2017. November 17.

USEPA. 2017. Letter to Chevron, ISS/ESS CCR for SWMU 11A dated August 29, 2017. December 13.

USEPA. 2017. Ex Situ Stabilization Construction Completion Report for SWMU 42, dated September 26, 2017. December 27.

USEPA. 2018. 1. Response to NJDEP Comments Response Action Item #1; ISS/ESS Implementation Work Plan – AOC 23, AOC 41, and SWMU 18, dated September 21, 2017. January 11.

USEPA. 2018. 1. Remediation of Benzene Impacts, Implementation Work Plan, Solid Waste Management Unit 35, dated February 2, 2018, and 2. Discharge to Groundwater Permit-by-Rule Authorization Request, dated February 2, 2018. March 16.

USEPA. 2018. Comments Letter. Implementation Work Plan – Area of Concern 38, dated September 6, 2017. March 16.

USEPA. 2018. Letter to Chevron. Ex Situ Stabilization Implementation Work Plan, SWMU 34, dated December 12, 2017. May 14.

USEPA. 2018. Letter to Chevron, Notification of Planned Physical Alteration to the Facility, Secondary Containment Liner Installation and Drainage System Improvement – L606 New York Harbor Expansion Project, East Yard, dated April 23, 2018. May 16.

USEPA. 2018. Comments Received. Supplemental Bioremediation Implementation Work Plan, AOC 31, ERH area, dated November 29, 2017. June.

USEPA. 2018. Addendum to AOC 28 ISS and ESS Implementation Work Plan – Appendix B Implementation Work Plan for Arsenic Impacts in Soil – AOC 28: Areas E and G, dated March 28, 2018. August 6.

USEPA. 2018. Approval Letter. Response to USEPA and NJDEP comments on the November 2017 Supplemental Bioremediation Implementation Work Plan, AOC 31, Electrical Resistance Heating Area, dated September 11, 2018. October 12.

USEPA. 2018. Approval Letter. No Further Action (NFA) Justification for Arsenic in Surficial Soil at Area of Concern 49, dated January 25, 2018. October 12.

USEPA. 2018. Response to USEPA/NJDEP comments on the March 2018 Addendum to AOC 28 ISS and ESS Implementation Work Plan – Appendix B Implementation Work Plan for Arsenic Impacts in Soil – AOC 28: Areas E and G, dated August 21, 2018. October 24.

USEPA and NJDEP. 2018. Approval Letter. No Further Action Justification for Arsenic in Surface Soil at Area of Concern 33 dated June 18, 2018. November 2.

USEPA. 2018. Ex Situ Stabilization Construction Completion Report for SWMU 40, dated November 1, 2017. November 13.

USEPA. 2018. Comments Letter. Justification for Transition to Monitored Natural Attenuation for Arsenic in Groundwater at SWMU 10, dated November 8, 2017. November 14.

UESPA. 2018. Conditional Approval Letter. Ex Situ Stabilization Construction Completion Report for SWMU 10, dated December 19, 2017. November 14.

USEPA and NJDEP. 2018. Conditional Approval. In situ and Ex situ Stabilization Construction Completion Report for AOC 29 dated February 8, 2018. December 6.

USEPA. 2019. Comments Letter – 1. Corrective Measures Implementation Work Plan, Solid Waste Management Units 5/21/43, dated September 28, 2018. 2. New Jersey Pollution Discharge Elimination System Discharge to Groundwater Permit-by-Rule Authorization Request, dated September 28, 2018. February 8.

USEPA. 2019. Comments letter – SWMU 34, Corrective Measure Implementation Work Plan, Revision 1, October 25, 2018. February 8.

USEPA. 2019. Approval Letter – 1. Implementation Work plan, In Situ Chemical Oxidation followed by Biostimulation, Solid Waste Management Unit 8, dated February 22, 2018 and 2. Discharge to Groundwater Permit by Rule Authorization Request, dated Feb. 22, 2018. February 19.

USEPA. 2019. In Situ and Ex Situ Stabilization Construction Completion Report for SWMU 7, dated April 3, 2018. February 19.

USEPA. 2019. Approval Letter – Justification for No Further Investigation for BaP in Soil Area of Concern 16C, dated June 13, 2018. February 19.

USEPA. 2019. 1. In Situ Chemical Oxidation Implementation Work Plan, Area of Concern EY1, dated October 11, 2018. 2. New Jersey Pollution Discharge Elimination System Discharge to Groundwater Permit-by-Rule Authorization Request, dated October 11, 2018. March 15.

USEPA. 2019. Comments Letter. 1. In Situ and Ex Situ Stabilization Construction Completion Report for Solid Waste Management Units 27 and 29, dated February 5, 2019. April 5.

USEPA. 2019. Corrective Measures Implementation Work Plan for Area of Concern 50 North, dated November 20, 2018. April 5.

USEPA. 2019. Comments Letter. Construction Completion Report for Area of Concern 37, dated December 6, 2018. April 5.

USEPA. 2019. In Situ Chemical Oxidation Permit-by-Rule Monitoring Report for SWMU 11B, dated November 26, 2018. April 10.

USEPA. 2019. In Situ Chemical Oxidation Long-Term Monitoring Report, Area of Concern 46, dated March 5, 2019. April 10.

USEPA. 2019. Construction Completion Report for Area of Concern 25, dated January 28, 2019. April 10.

USEPA. 2019. Comments Letter. ISS/ESS CCR for SWMU 20, dated November 15, 2018. April 17.

USEPA. 2019. Draft Central Yard Deed Notice, dated February 27, 2019. June 7.

USEPA. 2019. Approval Letter. 1. SWMU 34, Corrective Measure Implementation Work Plan, Rev1, dated October 25, 2018 and 2. Response to USEPA and NJDEP Comments on the October 2018 SWMU 34 CMI IWP, Rev1, dated April 16, 2019. June 12.

USEPA. 2019. Approval Letter. 1. Air Sparging Pilot Study Work Plan, Area of Concern 8, dated June 4, 2019 and 2. Additional Supporting Documentation, submitted in email dated June 18, 2019. June 26.

USEPA. 2019. Approval Letter. Response to USEPA and NJDEP Comments on the SWMU 20 ISS/ESS CCR, dated July 2, 2019. July 2.

USEPA. 2019. Approval Letter. Response to USEPA and NJDEP comments on Justification for Transition to MNA for Arsenic in Groundwater at SWMU 10, dated June 18, 2019. July 3.

USEPA. 2019. Corrective Measures Implementation Work Plan Addendum for Solid Waste Management Units 5/21/43, dated June 20, 2019. July 13.

USEPA. 2019. Comments Letter. Area of Concern 38 Construction Completion Report, dated April 30, 2019. July 23.

USEPA. 2019. Approval Letter. No Further Action Report for Arsenic in Surface Soil, Central Yard, dated April 23, 2019. July 26.

USEPA. 2019. Approval Letter, In Situ Stabilization and Ex Situ Stabilization Construction Completion Report for SWMU 20. July 26.

USEPA. 2019. Comments Letter. Response to USEPA and NJDEP Comments, AOC 50N Corrective Measures Implementation Work Plan, dated July 2, 2019. July 26.

USEPA. 2019. Pre-Design Investigation Summaries, dated August 2017, for areas: NF3 LNAPL Area, NF4 LNAPL Area, NF5 LNAPL Area, SWMU 40 LNAPL Area, SWMU 41 LNAPL Area, SSPL LNAPL Area, EY4A LNAPL Area, EY4B LNAPL Area. July 26.

USEPA. 2019. No Further Investigation for Arsenic in Surface Soil at Area of Concern 16B, Area 1/35, dated April 11, 2019. July 26.

USEPA. 2019. Monitored Natural Attenuation Implementation Work Plan, dated September 28, 2018. July 26.

USEPA. 2019. Approval Letter. No Further Action Report for Arsenic in Surface Soil, Main Yard, dated February 26, 2019. July 30.

USEPA. 2019. Response to USEPA and NJDEP Comments, ISS and ESS Construction Completion Report for AOC 29, dated August 5, 2019. August 23.

USEPA. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 38 and 39, dated July 31, 2019. August 23.

USEPA. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 31, dated June 5, 2019. August 23.

USEPA. 2019. Approval Letter. Response to USEPA and NJDEP Comments, ESS Construction Completion Report for SWMU 10, dated July 30, 2019. August 30.

USEPA. 2019. Approval Letter. Response to USEPA and NJDEP Comments, No Further Investigation Justification for Arsenic in Surface Soil at AOC 16B Area 1/35, dated August 13, 2019 (original report dated April 11, 2019). September 4.

USEPA. 2019. Corrective Measures Implementation Work Plan SWMU 17, dated February 2019. October 22.

USEPA. 2019. In Situ Chemical Fixation Implementation Work Plan and PBR Proposal for AOC 45/56, dated August 30, 2019. October 29.

USEPA. 2019. Area of Concern (AOC) 9A, Construction Completion Report (CCR)/Implementation Work Plan (IWP), dated October 2019. November 20.

USEPA. 2019. Implementation Work Plan to Address Arsenic Impacted Surface Soil in AOC 14/26 and SWMU 26, dated October 7, 2019. November 13.

USEPA. 2019. Area of Concern (AOC) 6B, Implementation Work Plan (IWP) to Address Arsenic (As) Impacted Surface Soil, dated November 2019. December 11.

USEPA. 2020. Approval Letter. Proposal for NFI or Remediation for Benzene in Soil and Groundwater in AOC 16 EY3, dated April 8, 2019. February 4.

USEPA. 2020. Approval Letter. Addendum to ISS/ESS PDI and NFI – AOC 46 dated May 21, 2019. February 4.

USEPA. 2020. Response to USEPA/NJDEP Comments (RTCs) ESS Construction Completion Report (CCR) for SWMU 40, dated October 31, 2019. February 6.

USEPA. 2020. Approval Letter. Response to USEPA and NJDEP Comments, ISS/ESS CCR for SWMUs 27/29, dated August 8, 2019. February 6.

USEPA. 2020. Approval Letter. ESS CCR for SWMU 19, dated December 12, 2019. March 4.

USEPA. 2020. Enhanced In Situ Bioremediation (EISB) Implementation Work Plan (IWP) AOC 44, dated October 2019. March 4.

USEPA. 2020. Approval Letter. Approval of ISS/ESS CCR, AOC 5/SWMU 39, dated November 2019. March 6.

USEPA. 2020. Approval Letter. Responses, Implementation Work Plan, Area of Concern 14 and Area of Concern 26. March 27.

USEPA. 2020. Approval Letter. Response to USEPA and NJDEP Comments, ISCF IWP for AOC 14/SWMU 26. March 27.

USEPA. 2020. Approval Letter. Justification for No Further Investigation for Lead and BaP in Soil: AOC 16B Area 2. March 27.

USEPA. 2020. ISS/ESS Construction Completion Report for AOC 23, AOC 41, SWMU 18, and PAOC 6, dated February 2020. April 6.

USEPA. 2020. 1. In Situ Chemical Fixation Implementation Work Plan for AOC 14/SWMU 26, dated January 2020. 2. Response to USEPA/NJDEP Comments, dated April 10, 2020. April 16.

USEPA. 2020. 1. Response to USEPA Comments on Area of Concern 38 Construction Completion Report, dated April 15, 2020. 2. Area of Concern 38 Construction Completion Report, dated April 30, 2019. April 21.

USEPA. 2020. Area of Concern 8 Air Sparging and Soil Vapor Extraction Implementation Work Plan, dated April 30, 2020. May 22.

USEPA. 2020. Comments on the In Situ Chemical Oxidation Implementation Work Plan, Area of Concern 15 and Solid Waste Management Units 6, 16, and 40. May 21.

USEPA. 2020. In Situ/Ex Situ Stabilization and Arsenic Cap, Construction Completion Report, Area of Concern 28, dated April 30, 2019. July 26.

USEPA. 2020. Approval Letter.1. AOC 22 CCR dated July 2020, 2. NFA Justification for Arsenic Surface Soils at EY, dated June 1, 2020, 3. Justification for NFA for Lead and BaP in Soil: MY, dated January 21, 2020. September 9.

USEPA. 2020. Approval Letter. AOC 22 CCR, dated July 2020. September 9.

USEPA. 2020. Approval Letter. ESS CCR for AOC 16B Area 1, dated June 23, 2020. September 9.

USEPA. 2020. Comments on Catalyst Beads Summary. September 22.

USEPA. 2020. Approval Letter. CM CCR for SWMU 17, dated April 30, 2020. September 28.

USEPA. 2020. CM CCR for AOC 50S, dated February 13, 2020. September 28.

USEPA. 2020. Approval Letter. ISCO Permit-by-Rule Monitoring Report for AOC 31N, dated July 8, 2020. September 30.

USEPA. 2020. In Situ Chemical Oxidation (ISCO) Long-Term Monitoring Report (LTMR), SWMU 10, dated April 2020. October 21.

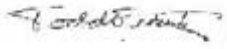
USEPA. 2020. Area of Concern (AOC) 9A, Construction Completion Report (CCR)/Implementation Work Plan (IWP), dated October 2019. November.

USEPA. 2020. Corrective Measures Implementation Work Plan Addendum, AOC 50 North, dated October 2019. December 1.

CLOSING

Based on the CMI work completed and the regulatory submittals presented herein, Chevron requests review and approval by the USEPA and NJDEP of this request for a CA550 determination for the Former Chevron Perth Amboy Facility. Should you require additional information for your review, please do not hesitate to contact me directly at (732) 738-2226.

Sincerely,



Todd Frantz
Senior Project Manager
Parsons

Attachment 1: AOC, SWMU & PAOC Location Map

cc: Charlie Zielinski, NJDEP
Brendan Leehan, Buckeye Perth Amboy Terminal, LLC
Krista Manley, Buckeye Perth Amboy Terminal, LLC

bcc: Brian Connors, CEMC
Scott Nelson, Brown and Caldwell
Ken Siet, TRC

D-ID Number 2020-072-36

ATTACHMENT 1
AOC, SWMU & PAOC Location Map

SOLID WASTE MANAGEMENT UNITs (SWMUs)

1. NORTH FIELD BASIN
2. SURGE POND
3. EAST YARD BASIN
4. LAND FARM
5. TEL BURIAL (W. OF SURGE POND)
6. TEL BURIAL (W. OF TANK 306)
7. TEL BURIAL - 2 BURIALS (SE. OF TANK 305)
8. TEL BURIAL - 2 BURIALS (NW OF EAST YARD BASIN)
9. TEL BURIAL - EAST YARD BASIN (N. OF TANK 753)
10. TEL BURIAL - 2 BURIALS (W. OF TANK 771)
11. TEL BURIAL - 3 BURIALS (ALONG CENTRAL R.R. R.O.W.)
12. TEL BURIAL - 3 BURIALS (NW. OF TANK 27)
13. TEL BURIAL (W. OF TANK 28)
14. TEL BURIAL - 2 BURIALS (SE. OF TANK 23)
15. TEL BURIAL (S. OF TANK 14)
16. TEL BURIAL (E. OF TANK 306)
17. TEL BURIAL (E. OF TANK 301)
18. TEL BURIAL (W. OF TANK 301)
19. TEL BURIAL (W. OF TANK 326)
20. TEL BURIAL (E. OF TANK 302)
21. TEL BURIAL (MUDFLATS)
22. TEL BURIAL (E. OF TANK 329)
23. TEL BURIAL (W. OF TANK 116)
24. TEL WEATHERING AREA (EAST OF TANK 9209, S. OF ETP)
25. TEL WEATHERING AREA (N. OF EAST YARD BASIN)
26. TEL WEATHERING AREA (S. OF EAST YARD BASIN)
27. TEL WEATHERING AREA (N. OF TANK 312, W. OF N.F.B.)
28. REACTOR BURIAL
29. FINES TRANSFER AREA
30. SHORT TERM STORAGE AREA
31. EFFLUENT TREATMENT PLANT
32. TBA WAREHOUSE PCB WASTE STORAGE AREA
33. TEMPORARY SLURRY PIT
34. DUMPSTER AREA AND DRAINAGE AREA
35. NO. 4 SEPARATOR
36. OIL WATER SEPARATOR NEAR EAST YARD BASIN
37. WEST YARD SLUDGE POND
38. NORTH FIELD SLOP POND
39. UNNAMED NORTH FIELD POND
40. OLD POND
41. DRYING AREA
42. CRUDE SLAB
43. MUD FLATS
44. UNNAMED MAIN YARD POND
45. IMPOUNDMENT S. OF EAST YARD BASIN
46. NORTH FIELD EXTENSION LAGOON 1
47. NORTH FIELD EXTENSION LAGOON 2
48. NORTH FIELD EXTENSION LAGOON 3
49. NORTH FIELD EXTENSION LAGOON 4
50. FORMER NORTH FIELD EXTENSION DEBRIS PILE #1
51. OILY SOIL PAD
52. TEL BURIAL AT TANK BASIN 13
53. POTENTIAL DISCHARGE INTO TANK BASIN 312
54. NO. 2 AMINE PLANT MOLTEN SULFUR PIT
55. NO. 2 AMINE PLANT HOLDING BASIN
56. NO. 3 SULFUR RECOVERY UNIT SULFUR PIT
57. NO. 3 SULFUR RECOVERY UNIT ACID SUMP
58. NO. 3 SULFUR RECOVERY UNIT NEUTRALIZATION SUMP
59. NO.4 SULFUR RECOVERY UNIT SULFUR PIT
60. NO.4 SULFUR RECOVERY UNIT ACID SUMP
61. NO. 2 AMINE PLANT WASH WATER COLLECTION SUMP
62. NO. 2 AMINE PLANT SLURRY COLLECTION SUMP

AREAS OF CONCERN (AOCs)

1. POTENTIAL DISHARGE FROM TANK 1
2. POTENTIAL DISCHARGE FROM TANK 3
3. POTENTIAL DISCHARGE FROM TANK 4
4. POTENTIAL DISCHARGE FROM TANK 106
5. PETROLEUM SUBSTANCE NEAR UGST E3
6A. OILY PETROLEUM MATERIAL AT B-26 , B-34
6B. OILY PETROLEUM MATERIAL AT B-29, B-30, B-31
6C. OILY PETROLEUM MATERIAL AT B-32, B-33
7. TARRY MATERIAL AT MW - 13
8. OILY AND TARRY MATERIAL AT B-27, B-28
9A. CONTAMINATION AT WELL NF-10
9B. CONTAMINATION AT WELL NF-11
10. STAINED SOIL AND GRAVEL IN AREA OF IAF TANK
11. POTENTIAL DEBRIS PILE ADJACENT TO FORMER BUILDING IN NORTH FIELD EXTENSION
12. POTENTIAL NORTH FIELD EXTENSION LAGOON 5
13. B-11 OILY FILL AREA
14. GWQAP OILY FILL AREA III
15. OIL RELEASE AT BUCKEYE PIPELINE MANIFOLD
16. OILY WATER SEWER SYSTEM
17. POTENTIAL DISCHARGE FROM TANK 20
18. POTENTIAL DISCHARGE FROM TANK 2
19. MAIN YARD PIPEWAY
20. AMBOY FIELD PIPE MANIFOLD
21. MAURER ROAD EXCAVATION
22. SHOPS BUILDING GROUNDWATER CONTAMINATION
23. TANK BASIN 327
24. MAIN YARD FIRE HYDRANT
25. MW-0037
26. EAST YARD BUNKER SLAB
27. TANK 777 PIPEWAY
28. ASPHALT PLANT TANKS FROM TANK 2
29. 5 BERTH COAL TAR
30. TANK 27 PIPEWAY
31. TANK 772 PUMP PAD
32. TANK 16 BASIN
33. TANK 314 BASIN
34. TANK 315 BASIN
35. TANK 771 BASIN
36. CHLORINATED PLUME
37. EAST YARD GASOLINE FILTERS
38. BARGE LOADING MANIFOLD AT TANK 761 & G180/181 NAPHTHA PUMPS
39. EAST YARD PUMP HOUSE & PRC LOADING RACK
40. TANK BASIN 22
41. TANK BASIN 300
42. TANK BASIN 310
43. TANK BASIN 311
44. TANK BASIN 313
45. TANK BASIN 748
46. TANK BASIN 749/780
47. #4 CRUDE UNIT
48. ISOMAX PROCESS PLANT
49. #3 RHENIFORMER
50. BULK STATION

POTENTIAL AREA OF CONCERN (PAOCs)

MANIFOLDS

1. PRC METER RACK
2. #3 BERTH
3. #4 BERTH
4. #5 BERTH
5. #6 OIL BLENDER
6. GASOLINE BLENDER
7. LEAD HOUSE
8. MAIN YARD OUTSIDE MANIFOLD
9. ALKY PLANT MANIFOLD PIT
10. BOARS NEST
11. 28 TANK MANIFOLD
12. CENTRAL YARD PUMPHOUSE
13. 757/758 MANIFOLD
14. SHOLZ MANIFOLD
15. 759 TANK MANIFOLD
16. GASOLINE SHIPPING PUMPS
20. BULK STATION GASOLINE PUMPS
21. COLONIAL PIPELINE
22. 312, 313, 318, PUMP MANIFOLD
23. BUCKEYE MANIFOLD

TANK BASINS

25. TANK BASIN 11
26. TANK BASIN 12
27. TANK BASIN 15
28. TANK BASIN 18
29. TANK BASIN 19
31. TANK BASIN 30, 31, 32
33. TANK BASIN 303
34. TANK BASIN 304
35. TANK BASIN 305
36. TANK BASIN 308
37. TANK BASIN 309
41. TANK BASIN 316
42. TANK BASIN 317
43. TANK BASIN 318
44. TANK BASIN 321, 322, 323, 324, 325
45. TANK BASIN 328
46. TANK BASIN 330
47. TANK BASIN 700
48. TANK BASIN 701
49. TANK BASIN 702
50. TANK BASIN 703
51. TANK BASIN 720, 721, 722
52. TANK BASIN 731
55. TANK BASIN 750
56. TANK BASIN 751
57. TANK BASIN 752
58. TANK BASIN 754
59. TANK BASIN 755, 756
60. TANK BASIN 757
61. TANK BASIN 758
62. TANK BASIN 760
63. TANK BASIN 765
64. TANK BASIN 766
65. TANK BASIN 767
66. TANK BASIN 768
67. TANK BASIN 769
68. TANK BASIN 770
69. TANK BASIN 773
70. TANK BASIN 774
71. TANK BASIN 775, 776
72. TANK BASIN 778
73. TANK BASIN 75D-1

PROCESS PLANTS

74. CATALYTIC CRACKER
75. ALKYLATION PLANT
76. #1 & 2 CRUDE UNIT
77. #3 CRUDE UNIT
79. #5 CRUDE UNIT
80. HEXANE PLANT
82. #2 RENIFORMER
84. PA PLANT
85. AIR BLOWING PLANT/EMULSION
86. HYDROTREATER
87. NASH PLANT

LOADING RACKS

88. PROPANE LOADING RACK
89. ASPHALT RAILCAR RACK
91. ASPHALT LOADING RACK
92. CAUSTIC/CRESLIC ACID LOADING RACK
93. STATE ST. PARKING LOT RACK
94. BUTANE LOADING RACK

LEGEND

- PAOC
- AOC
- SWMU
- Facility Boundary
- Revised LNAPL Extent
- Historical LNAPL Extent

OILY WATER SEWER SYSTEM

- OWSS
- Manhole - Below Grade
- Catch Basin
- C.I. Shut-Off Valve

N W E S

0 100 200 400 Feet

NOTES:
1. AOC's and SWMU's that have been completed under a NJDEP MOA are depicted with gray unit symbols.
2. Aerial photograph dated October 2017 was provided by Parsons.

CHEVRON ASPHALT REFINERY
AOC, SWMU & PAOC LOCATION MAP
CEMC CMI PROJECT

CHEVRON
ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY

PROJECT #:	DATE:	DWN:	CHKD:	FIG NO.:
450852-02000	12/7/2020	ADW	CK	v1

Path: C:\Projects\Chevron\DMS\GIS\Sitewide\SWMU_AOC_& PAOC Aerial Map with LNAPL Areas.mxd